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Author	Hanley, Ian George.
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AN EVALUATION OF REALITY ORIENTATION PROCEDURES WITH THE MENTALLY IMPAIRED ELDERLY

IAN GEORGE HANLEY

Ph. D.
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ABSTRACT

The studies to be presented here are concerned with investigating the effectiveness of Reality Orientation procedures in the institutional management of those suffering from the dementias of old age. The initial chapter considers the dramatic increase in the numbers of people suffering from dementia and points to the urgent need for research on management procedures. The second chapter examines dementia itself and briefly describes the range of psychological and behavioural disabilities that accompany the dementing process. The third chapter reviews the main psychologically based intervention strategies and describes the procedures of Reality Orientation (RO). An attempt is then made in the fourth chapter to relate these available approaches to both the disabilities presented by the disease process and the typical characteristics of institutional care settings. It is argued that Reality Orientation, as a package of procedures designed specifically for use in the care of the mentally impaired elderly, has the most obvious potential.

The aims of the study are presented in the fifth chapter. The primary concern is to evaluate the effectiveness of Twenty-four Hour RO and Class RO, both separately and in combination, with a large sample of dementing subjects drawn from the two main types of care setting; a psychogeriatric hospital and a local authority run old people's home. The effectiveness of these procedures is examined in both the short and longer term and in relationship to the factors of residential location and degree of dementia. As well as examining the effects of these procedures on the demented elderly sample itself, an attempt is also made to evaluate the effects on care staff whose task it is to apply the procedures. Additionally an attempt is made to separate out and evaluate the effectiveness of two principal components of 24 RO.

The/

The sixth chapter describes the general design and methodology adopted in the experimental trials and then the seventh to twelfth chapters describe in turn each of the six experiments conducted, present the results obtained and discuss the basic conclusions that can be reached in each.

The conclusion reached in the thirteenth chapter is that the effectiveness of Class RO and 24 RO can be summarized as conforming to the following model: over the short term application Class RO appears to produce restricted cognitive improvement in the demented subjects. No behavioural improvements are evident and the level of engagement of subjects with their environment seems reduced. Over the longer term, there is no indication of Class RO having any positive or negative effects. Twenty-four Hour RO, on the other hand, seems to produce both more extensive cognitive improvement and behavioural improvement when examined in the short term. This seems to be facilitated by the addition of Class RO. In the long term most of these gains maintain and are directly attributable to 24 RO working alone. Of the two components of RO examined, staff to patient interaction seems to have the most beneficial effect in facilitating discrete behavioural improvements. However, no evidence was obtained to positively indicate that staff generally changed their style of interaction with patients as a result of 24 RO implementation. Some of the implications of these findings are discussed.

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CHAPTER 1: INTRODUCTION

Changes in the elderly population

Many more people reach old age today than used to. Table 1 illustrates this change in life expectancy.

Table 1(a)

Life Expectancy in England and Wales

	At birth		At 65 years	
	Male	Female	Male	Female
1841	40	42	11	12
1932	59	63	11	13
1972	69	75	12	16

Source: Registrar General, 1974.

The increase in the number of the elderly is largely a result of more people surviving childhood than used to. A large and progressive increase in life expectancy at birth can be seen to have occurred over the past one hundred years or so. In contrast, life expectancy at age 65 has changed little. If a person reached 65 in the nineteenth century then he could expect to live almost as many more years as a 65 year old in the late twentieth century. The decrease in infant mortality occurred before the trend towards smaller families, resulting in a bulge in the population that has now reached old age. Table 1b illustrates this change in the elderly population.

Table 1(b)

Proportion of persons aged 65 years and over

1901	1931	1951	1971	1980
4.7%	7.4%	11%	13%	15% (approx.)

Table 1(c)

Population of England and Wales

Year	Total all ages	Aged 65 and over
1901	32.5 million	1.5 million
1971	49.3 million	6.9 million

(From Arie, T., and Isaacs, A.D., (1978). The development of psychiatric services for the elderly in Britain. In Isaacs, A.D., and Post, F. (Eds.). Studies in Geriatric Psychiatry, John Wiley & Sons, Chichester.)

At the turn of the century only 5% of the population was aged over 65 years; since then this proportion has increased, reaching 13% of the total population, and this figure is expected to rise until around 1990, after which it will remain steady or drop. This increase is not simply a proportionate one; more people are reaching old age than used to (from 1.5 million people aged over 65 at the turn of the century, to 6.9 million by 1971).

When the figures are broken down for those aged 65-74 and those over 75 it is evident that it is the very old whose numbers have increased most rapidly. Moreover, while the number of those aged 65-74 will actually decline in the present decade, those aged over 75 will carry on increasing into the next century. Thus the over 75's now account for more than 35% of all old people, but by the end of this century this will increase to 45%. It is this older group which places the greatest demand on medical and social services.

Dementia in the elderly

Ageing is accompanied by an increased prevalence of psychological disorders of which the dementias are perhaps the most prominent. The prevalence of severe dementia has been estimated to increase from approximately 3% in persons aged 65 to 75 years, to over 20% in those over 80 years. Given that one in every five of the very old (i.e., the group increasing so much in numbers), may be estimated to be severely demented, the extent of the problem of dementia becomes apparent. Post (1979) has argued that a 15% prevalence of severe dementia in the over 75s may be taken as a conservative estimate of the true rate.

Despite the conclusion that the problem of dementia is of particular importance within the overall problem posed by the growing number of elderly, the study of dementia has until recently been much neglected. Our lack of knowledge and understanding is in sharp contrast with the extent and severity of this group of diseases, which is arguably the most significant single problem facing the health services.

A report published in 1977 by the Medical Research Council, stressed the urgent need for research on the dementias and gave an important role to the contribution from psychology. Studies on how to care for demented patients and attempt to improve their level of functioning was one avenue recommended as a priority. The potential importance of such research is in the context of ensuring that afflicted individuals enjoy the highest quality of life that is possible and also ease the burden of care when resources are already restricted. As the M.R.C. report points out; many demented patients deteriorate slowly and survive for many years; and the disabilities they present at various stages seem often greater than they need be.

This dissertation is concerned with the evaluation of one psychological approach, eminently suited it would appear, to the care of the demented patient. Reality Orientation (RO) has been a popular approach in the U.S.A. for a number of years and has recently attracted considerable attention in this country. However its popularity has never been backed by a solid base of empirical support as to its effectiveness. Indeed only one component of RO has really received any research attention at all. The present study aims to redress some of this imbalance and present data as to the effects of RO applied in the care of dementing old people.

REVIEW OF THE LITERATURE

CHAPTER 2: DEMENTIA AND THE DEFICITS ASSOCIATED

I. Defining Dementia

Who and what are the demented elderly? What are their characteristics and how are these characteristics determined? What do we know about their prognosis or course over time? Before setting out to answer these and other questions a first task must be to sort out the terminology used to refer to this population in academic and clinical practice. In the light of our considerable sophistication in describing and diagnosing mental infirmity in the elderly it is perhaps unfortunate that the literature is filled with a bewildering array of terms implying in varying degrees the concepts of diagnosis, causation and prognosis. A cursory glance at a small number of medical or scientific papers will usually produce at least the following crop of terms: chronic brain syndrome, organic cerebral impairment, brain failure, elderly mentally impaired, dementia, senile elderly, confused elderly!

To confuse the reader further (some of) these terms are often used in different ways and with different intentions. Sometimes the term 'dementia', for example, implies a specific diagnostic entity, i.e., senile dementia of the Alzheimer's type, on other occasions it implies a range or set of diagnostic entities, i.e., Alzheimers disease, arterio-sclerotic or cerebrovascular dementia, Picks disease, etc., all of the 'irreversible' category. Yet again dementia can refer to an even broader range of conditions which includes 'reversible' disorders or it can be used quite casually as a descriptive term vaguely linked to certain characteristics of a particular group of elderly patients. It is not uncommon, especially in American studies, to see the terms 'senile' or 'demented' applied to elderly psychiatric patients institutionalized many years earlier as psychotics!

It is well known that labelling something, although in itself an interesting, necessary and often exacting exercise, does not generally increase our capacity to understand it. Quite frequently a term or label comes to take on a meaning or association not originally intended. This has happened already with terms such as senile, demented, organically impaired, etc. which have been taken in some quarters to imply negativism, hopelessness, indeed all that goes or encourages a demoralized approach to care (Blumenthal, 1979). In an attempt, presumably to remove the stigma implied by terms such as these, new, but unfortunately no less ambiguous terminologies have been derived. It is now fashionable, in at least non-psychiatric circles, to talk of the confused elderly, the mentally impaired elderly and so on. These terms certainly do away with some of the unpleasant associations of those they are designed to replace but again, and perhaps more so, these terms do not adequately define the populations they are applied to.

Now perhaps, as may be argued later in this thesis it makes little practical difference, in terms of planning a psychological treatment programme to know what label, or even diagnosis, has been applied in a given case. Perhaps, as will certainly be stressed later it makes sense to talk in terms of specifiable dimensions of impairment as opposed to such global labels. However even accepting such a position does not undermine the necessity to adequately describe in strict diagnostic terms the population with which we are concerned. Only then can we have a sound basis for comparing different forms of treatment and provision of health care services.

Given the confusing terminology evident in much of the literature, especially that part which describes strategies of psychological intervention, it is necessary to start with a discussion of mental infirmity in the elderly which stresses strict diagnostic nomenclature and unambivalent terminology. This may not be an easy task as many of the semantic difficulties referred to above emerge from attempts to assign more, as opposed to less precise qualities to terms such as "dementia" than usage will support (Wells, 1977).

The term dementia as defined in lay and medical communication illustrates this question of usage. Welsters Third New International Dictionary defines dementia as "a condition of deteriorated mentality that is characterized by marked decline from the individual's former intellectual level and often by emotional apathy", whereas the twenty-fifth edition of Dorlands Illustrated Medical Dictionary defines it as "a general designation for mental deterioration". Neither definition is sufficiently specific to explain the continued use of the term but as Wells (1977) explains this is an example of codified definition lagging behind accepted usage. Most authorities (Roth, 1975; Lishman, 1980; Angel, 1977; Wells, 1972, 1977 and 1978) seem content to accept dementia as a general term identifying a broad clinical spectrum resulting from global brain dysfunction. In fact, as Lishman has stressed in defining dementia as "an acquired global impairment of intellect, memory and personality but without impairment of consciousness", it is important to be vague in order to underline our uncertainty and the need for cautious and careful separation of the true dementia syndrome from the many syndromes and disorders which mimic it, notably the focal cerebral syndromes and the functional psychiatric disorders. Only then are the more precise diagnostic categories of differential diagnosis considered and the common disease entities of dementia specified.

The imprecision of the term dementia itself is shown up clearly in the variety of ways it is defined. Authorities are undecided whether to define it by social criteria (failure of activities of everyday life) or in global impressionistic terms (mental decay), or in terms of sub-functions (intellectual capacity and memory), or in terms of a supposed aetiology (intellectual decay of old age), (McDonald, 1969).

II. The Diagnosis of Dementia

The problems of a general definition are largely set aside when we come to consider dementia in a diagnostic sense which is used to refer to a specific group of diseases. The conditions considered to fall into the category of the dementias are commonly divided into two groups according to the age of onset. Those occurring after some arbitrary age level, often taken as 65 years, are designated senile dementias, whilst those manifest before this age level constitute the presenile dementias. The main types of dementia occurring in the senile and pre-senile age ranges are shown in Table 2.

Table 2

The main diseases associated with dementia

Presenile group	Senile group
Alzheimer's disease	Senile dementia
Pick's disease	Arteriosclerotic dementia
Huntington's chorea	
Jacob Creutzfeldt's disease	
Neurosyphilis	

As Miller (1977) has pointed out certain of these conditions can be set aside from the rest. Within the presenile range Huntington's chorea, Jacob Creutzfeldt's disease and neurosyphilis are all rare forms of dementia. They can be distinguished from one another and from the rest of the dementias on the basis of special investigations, family history and characteristic motor signs. Arteriosclerotic dementia was assumed until quite recently to account for a large proportion of dementing illness. However, several recent pathological and clinical investigations (Tomlinson et al, 1970; Marsden and Hamson, 1972; Freeman, 1976) have established that cerebral changes due to arteriosclerosis accounted definitely for only between 8-12% of the cases. It is therefore unjustified to assume that most dementia in the elderly results from vascular disease. The diagnosis of arteriosclerotic dementia is only justified when there is evidence of multiple strokes (Pearse & Miller, 1973) producing sudden exacerbations in the condition as opposed to the relatively smooth and steady decline found in most cases of dementia.

There now remains the large proportion of patients with dementia who fall into the categories of Alzheimer's, Pick's or senile dementia. Discrimination between these conditions is difficult in practice (Pearce & Miller, 1973). In the clinical situation Alzheimer's disease can only be distinguished from senile dementia on the dubious grounds of an arbitrary age level. Pick's disease is very rare and similarly very difficult to separate from Alzheimer's disease in life. These three conditions all have one important and overriding feature in common: they are all associated with cerebral atrophy for which there is no established cause. This has been referred to as "primary cerebral atrophy" (Pearce & Miller, 1973) or as "primary dementia" (Lishman, 1980).

All the above disorders have been characterized as being chronic, progressive and irreversible, at least in a neuropathological sense.

However, the broad definition of dementia discussed earlier includes a range of other conditions whose onset is generally considered acute and course non-progressive. This group of conditions has been termed "secondary dementias" (Roth, 1975; Wells, 1977). Irreversibility is not then considered the sine qu non for the diagnosis of dementia. Table 3 lists some of the causes of secondary dementia.

Table 3

The main conditions associated with secondary dementia

Intracranial	Extracranial
Space occupying lesions	Vitamin deficiency
Normal pressure hydrocephalus	Alcohol toxicity
Posttraumatic	Pernicious anaemia
Epilepsy	Thyroid disease
	Neoplasia

The relative contribution of the different dementing conditions, both primary and secondary is becoming better understood. Diligent investigation of 'dementia' uncovers numerous disorders that require medical treatment. In the studies by Marsden and Hamson (1972), Katzman (1975) and Freeman (1976) correctable disorders were found in 15% of 222 patients. These included depression, drug toxicity, normal pressure hydrocephalus, benign intracranial masses, thyroid disease, pernicious anaemia, epilepsy and hepatic failure. Noncorrectable disorders requiring intervention found in 20-25% of these patients included multi-infarct dementia with hypertension, malignant brain tumours, neurosyphilis and Huntington's chorea. Treatment for these conditions is important even though it cannot reverse the pathologic process entirely.

As summarized by Wells (1978) "thorough diagnostic evaluation can be expected to identify disorders with specific therapeutic implications in 30-50% of patients thought to be demented." Table 4 summarizes the diagnoses established in the three studies totalling 222 patients mentioned above.

Table 4

Summary of diagnoses in three reported series of 222 patients fully evaluated for dementia

Diagnosis	Number	Percent
Atrophy of unknown cause	113	51
Vascular disease	17	8
Normal pressure hydrocephalus	14	6
Dementia in alcoholics	13	6
Intracranial masses	12	5
Huntington's chorea	10	5
Depression	9	4
Drug toxicity	7	3
Dementia (uncertain)	7	3
Other*	20	9

*Other diagnoses, each seen in 1% or less of the 222 patients were as follows: Creutzfeldt-Jakob disease, posttraumatic, thyroid disease, post encephalitic, psychiatric disease, neurosyphilis, amyotrophic lateral sclerosis, postsubarachnoid haemorrhage, Parkinson's disease, pernicious anaemia, liver failure and epilepsy.

As already mentioned the large proportion of patients with dementia fall into the categories of Alzheimer's or senile dementia and to a much lesser extent, arterioschlerotic or multi-infarct dementia. How reliable is the recognition and diagnosis of these disorders? The answer to this seems to depend largely on the stage of the illness at which the diagnosis is undertaken. Early diagnosis is a particular problem. Williamson et al

(1964) in a survey of 200 patients over 65 years of age who were on the lists of three Edinburgh general practitioners, identified 55 patients with some degree of dementia, only 7 of whom were known by their practitioners to be demented! There is, on the other hand evidence that dementia is overdiagnosed. Especially problematic here is the tendency to misdiagnose functional disorders as organic, especially in the elderly. This appears to be a particular problem in the United States. In a study comparing psychiatric diagnoses given to patients over 65 in three cities, Duckworth and Ross (1975) found that dementia was diagnosed with more than 50% greater frequency in New York than in either Toronto or London. Similarly Copeland et al (1975) in a cross-national study of diagnosis showed a tendency for diagnosing more organic dementing patients in New York.

Nott and Fleminger (1975) reported on a follow-up, 5-25 years later, of 35 patients diagnosed as having presenile dementia at Guy's Hospital in London. The initial diagnosis was confirmed by progressive deterioration in only 15 (43%). In a similar follow-up study at the Maudsley, Ron et al (1978) identified wrong diagnosis in approximately one third of 52 cases diagnosed as presenile dementia.

Diagnostic accuracy appears to improve when presenile dementia is excluded. Marsden and Harrison (1972), in a study of 106 consecutive hospital admissions who had been screened by a consultant psychiatrist/ neurologist before admission, found that a diagnosis of dementia was corroborated in 84 (80%) with a further 7% described as 'possible dementia'. In a recent Newcastle study of 100 dements examined at post-mortem 84% were found to have Alzbbimer's or multi-infarct neuropathology, 4% had intracranial lesions and perhaps surprisingly the remaining 12% had normal brains

Smith et al (1976) in Australia also identified 11% of a sample of 100 dements to have no evident brain pathology.

An entirely satisfactory explanation of these errors of diagnostic omission and commission is lacking. What has been established is that early in the course of the disease, patients are likely to complain of somatic or affectual discomforts that point to other diagnoses. Even patients with moderately advanced disease may conceal their dysfunction quite skilfully by using well-preserved social skills. On the other hand, diagnosing dementia when it is not present often arises because a patient, appearing demented, is asked questions relevant to investigating the possibility of organic brain disease and answers are often consistent with such a diagnosis. This has been described as pseudodementia (Kiloh, 1961; Post, 1975; Wells, 1978b). Nevertheless the gradual deterioration that accompanies dementia allows reasonably accurate diagnosis provided care is taken to follow-up subjects for short periods (Miller, 1977). Certain underlying neuropathological changes have been described in dementia and are assumed to be linked aetiologically with the progressive course of functional disabilities that occurs in patients.

III. Neuropathology of dementia

The most obvious pathological change in Alzheimer's dementia is the atrophy of the brain. The total brain weight is reduced, the gyri are shrunken with consequent widening of the sulci, and the ventricles are enlarged. Microscopically the major features are the occurrence of senile plaques, neurofibrillary tangles and granuovacuolar changes. Many of these changes can be found to a lesser extent in the normal ageing brain. Likewise ischemic lesions, the main characteristic of arteriosclerotic dementia, is evident in approximately 50% of normal subjects over 65 who retain normal intellect (Tomlinson, 1977). It is the volume of this infarcted tissue which characterizes the demented patient. There is strong evidence of a high correlation between the degree of this neuropathological impairment, especially plaque count, and the degree of accompanying functional impairment (Blessed et al, 1968; Roth et al, 1966; Corsellis, 1962). For a group of 60 subjects comprising almost equal numbers of dementia patients and normal elderly these investigators found a correlation of 0.77 between the score on a dementia scale and the plaque count. That this is by no means a perfect correlation is underlined in the earlier work of Rothschild and Sharp (1941) who, in albeit a methodologically weaker paper, demonstrate that mild degrees of neuropathological involvement may be associated with marked clinical dementia and more severe pathological features with only moderate dementia.

Brains from patients with senile dementia have also been shown to have abnormally low concentrations of the enzymes choline acetyltransferase and acetylcholinesterase involved in the metabolism of the neurotransmitter, acetylcholine in the amygdala, the hippocampus and the cerebral cortex.

IV. The Incidence of Dementia

The extent of the problem of dementia in society is reflected in the description of "dementia - the quiet epidemis", (British Medical Journal, 1978). The rise in the number of dementing elderly poses a major challenge to the Health and Social Services.

Kay (1964) found an overall prevalence of about 10% for senile and arteriosclerotic dementia combined in a sample of elderly subjects in Newcastle-upon-Tyne. Of this 10% about half were judged to have severe or moderate mental deterioration and the rest had a mild degree of mental deterioration. In a laterstudy which applied stricter criteria Kay et al (1970) combined new data from a further sample of subjects in Newcastle with the earlier data, having modified this to meet the new criteria. This reduced the overall prevalence rate for those over 65 years to 6.2%. Prevalence rates for different age groups are given in Table 5. It can be seen that the prevalence rate increases dramatically for subjects over 80 years old.

Table 5

Prevalence of dementia in Newcastle-upon-Tyne.
(Data taken from Kay et al (1970))

Age (years)	Prevalence (%)
65 - 69	2.3
70 - 74	2.8
75 - 79	5.3
80 and over	22.0
Total	6.2

Government population projections (HMSO, 1976) predict an increase of one million in the elderly population between 1971 - 1991. Since the most aged group (over 80 years) is the section of the population which is increasing most rapidly it is timely that efforts are now being made to deal with the consequent increase in the demented population (Lishman, 1977). The older the patient the greater the incidence of senile dementia caused by primary parenchymatous degeneration or arteriosclerotic disease (Hachinski et al, 1974). Kay et al (1970) estimate that demented subjects were three times as likely as psychiatrically normal subjects to be admitted to hospitals and clinics of all types including those dealing with physical diseases. There is evidence of increasing levels of behavioural disability in elderly residential and hospital populations (Wilkin et al, 1978; Pattie et al, 1979).

An interesting point is that 5% of the elderly living at home have dementia as severe as that occurring in hospitalized subjects (Kay et al, 1964). This might reflect the importance of social factors in determining admission to hospital or other types of instituion (Gilhooley, 1980). In fact there are five demented patients in the community for every one in hospital (Kay et al, 1964). This does not include those who show mild mental impairment which is not in itself prognostic of dementia and as Kral (1965) indicates may often be a 'benign' as opposed to 'malignant' senile memory defect. It is clear that the increases in dementing illness presents a grave and serious challenge to already overstretched Health and Social Services.

V. The Clinical Characteristics of Dementia

In describing the clinical manifestations of dementia it is usually the defects in orientation, memory intellectual function, judgement and affectivity that are stressed in accounts of symptomatology. These classic features dominate the clinical picture especially in the advanced stages of the dementing process. As inferred earlier, the presenting signs and symptoms of early dementia are often more subtle and may be easily overlooked (Williamson, 1964). Wells (1967) refers to "the richness of the clinical picture" that is present in the early stages. Kahn/et al (1975) indeed has demonstrated that focussing on the primary symptom of memory loss can have disadvantages. In a population of patients over 50 the complaint of memory loss correlates well with depression and poorly with evidence of brain damage. Memory impairment is usually minimized by patients with significant dementia. Paulson (1977) calls attention to the retention of social skills by many patients with significantly advanced dementia so that evidence of dementia may be concealed in ordinary encounters and on superficial inquiry. When symptoms do present they may differ little either qualitatively or quantitatively from those that occur in normal, healthy individuals who are exhausted, anxious or subject to severe environmental pressures. Perhaps this accounts for how rarely primary physicians are aware of dementia in their elderly patients (Arie, 1973).

The early complaint from relatives is that the patient is "not himself" meaning that changes in function are noticed that are quite specific to the particular person, whether described in terms of alterations of drives, mood, enthusiasms, capacity to give and receive affection, creativity or other features. Because these most complex of human brain functions are often first affected in the dementing process, one might guess that usually the onset is readily discernible to the patient and those about him, but this is often not the case. The onset is often dated in retrospect and with imprecision. There is also often a delay between the time when symptoms are first observed by family members and the time when a definite medical opinion is sought. Indeed it is often the appearance of a crisis rather than the appearance of symptoms which precipitates the call for medical assistance. Arie (1973) has described several situations that may result in a crisis calling for immediate medical intervention:

(1) Something new has happened to the patient, such as a patient not previously incapacitated by his dementia becomes severely incapacitated by it during an episode of infection.

(2)/...

(2) Something has happened in the social mileiu, such as the death of the spouse, thus removing a vital environmental support.

(3) The crisis is a manipulation of the caring system, as for example, "Enough is enough". Nothing new has happened, but the caretaking person can tolerate the pressure of looking after the demented person no longer.

As the illness takes its course the symptomatology becomes more florid and diagnosis becomes easier. Appropriate dress and personal cleanliness may be ignored, there is usually a diminution of anxiety with progressive flattening of affect. Personal warmth and concern for others often disappear. Defective memory, particularly for recent events is blatant. Time and space orientation are faulty, the patient is easily lost, learning ability is markedly impaired. He is unable to function in complex situations, has trouble understanding and following directions and often loses his train of thought. Some patients are restless and overactive; others, lethargic and lacking in energy. Motor and sensory neurological signs of brain dysfunction may begin to appear depending on the rapidity of the degenerative process and the extent and site of brain damage. Indeed, according to Wells (1977) "no one with a modicum of medical and psychological knowledge fails to recognize the symptoms and signs of late-stage dementia".

The balance of this chapter will be devoted to a more rigorous and detailed description of the cognitive changes that accompany dementia and their prevalence in different institutional populations.

VI. Cognitive Changes in Dementia

It is not easy to separate out the different cognitive processes as most interact one with the other and precise classification is impossible. Let us start then with consideration of what is perhaps the most outstanding general characteristic of cognitive change in dementia; that which occurs in global intellectual ability, and then go on to review briefly the changes in the more specific cognitive processes.

Intellectual ability

The very term 'dementia' implies above all else a deterioration in intellectual functioning. It is therefore to be expected that patients with dementia would show a lower level of performance on all types of intellectual task including the standardized tests of intelligence. As dementia is a condition found in the older individual these changes will be a compound of the effects of the disease process itself and changes which would have occurred anyway as a result of the normal processes of ageing. It would be inappropriate to digress here into consideration of the vast amount of work on the cognitive changes which accompany normal ageing. Suffice it to say that as a person ages some mental functions decline while others stay stable or may even improve. Problem-solving requiring a grasp of complex relationships, abstract thought and mental transformations which use short-term memory are functions likely to suffer impairment; whereas vocabulary, routine verbal skills and factual general knowledge, i.e., functions requiring the use of words and the reproduction of acquired skills are well maintained.

Several investigators have applied standardized tests of intelligence, notably the Wechsler Scales with demented subjects. The results of these investigations have been summarized by Miller (1977) and are shown in Table 6. It is apparent that all report average IQs below the expected mean for the population of 100. Where control groups have also been tested, the dements invariably emerge with lower scores.

When verbal and performance IQs are compared the performance IQs are always lower. As Miller points out, there are a number of possible reasons for this discrepancy. Firstly speed may be an important factor in the subtests comprising the performance scale. Speed is of very little significance for most of the verbal subtests. Thus the demented subject may be particularly impaired on speeded tests. However, when performance on the Mill Hill Vocabulary scale and the Progressive Matrices are compared dements still show a similar tendency towards higher scores on the more verbal of these two 'unspeeded' tests (Orme, 1957; Kendrick et al, 1967; and Kendrick & Post, 1965). This is supported by clinical impression. When demented subjects fail they tend to fail completely giving the impression that more generous time limits would not result in a correct solution.

Table 6

Summary of studies applying the Wechsler Intelligence Scales to groups of demented patients expressed as mean IQs (from Miller, 1977)

	N	Verbal	Performance	Full scale
Wechsler Bellevue				
Botwinnick & Birren (1951a)	31	-	-	84.1
Cleveland & Dysinger (1944)	17	89.5	52.8	-
Dorken & Greenbloom (1953)	67	-	-	77.6
Lovett Doust et al (1953)	89	-	-	84.5
W.A.I.S.				
Bolton et al (1966)	47	83.6	77.1	79.7
Kendrick et al (1965)	20	93.1	79.2	-
Kendrick & Post (1967)	10	96.0	79.5	-
Miller (Unpublished)	20	78.1	68.8	72.5
Sanderson & Inglis (1961)	15	89.0	-	-

Two other possible explanations of the verbal-performance discrepancy proposed by Miller are (1) that the performance scale subtests rely heavily on the manipulation of visuospatial relationships which may be especially impaired in dementia, while (2) the verbal scale tends to rely on well practised verbal and arithmetical activities and overlearned pieces of information in contrast to the performance scale items which are much less familiar and require the subject to adjust to new situations. It is likely that when better understanding of the verbal performance deficit is forthcoming it will implicate the interaction of a number of factors.

Work towards understanding the nature of the verbal performance deficit in dementia has been hampered by a number of factors. Firstly, when the profiles of the individual subtests on the W.A.I.S. are examined for a number of demented subjects, no characteristic profile emerges. The variability of performance by dements on all but two of the subtests is high as reflected by standard deviations above the normal level. This reflects not only the low reliability of individual subtests and the fact that we know very little about the specific abilities being measured but also the very high variability between individual patients with dementia.

Moreover, the measurement of intellectual decline has proven even more problematic. Ideally this could be achieved by comparing a patient's level of functioning on a given test with results obtained from the same test just prior to the onset of the illness. This is rarely possible in practice and as a result of the problems inherent in direct assessment of intellectual decline most studies have relied heavily on the use of indirect methods, e.g., those based on the notion that vocabulary score is a reliable measure of premorbid intelligence, being resistant to the disruptive effects of neurological disease, and similarly those methods which compute a deterioration index based on the 'hold' and 'don't hold' subtests of the W.A.I.S. Strong objections have been raised to the basic assumptions on which these methods are based (Yates, 1956 and Miller 1977) and the discriminative ability of this type of index has been shown to be poor (Savage, 1971).

Fortunately several studies have investigated intellectual deterioration directly by retesting dements at suitable intervals (Kendrick & Post, 1967; Cowan et al, 1975 and Whitehead, 1973). The work of Jonsson and Waldton (1973) reporting on a sample of dements tested and retested over an extended period of 2½-3 years is a useful illustration of the findings from this more direct approach. On each of fifteen tests selected on the basis of being usable with dements of differing degrees of impairment, a remarkably similar picture emerged: over the five retests that occurred in a 2½ year period there was slow and mostly even deterioration in performance. Moreover when the course was followed for each individual patient the same picture emerged in practically every case. The means of scores for each test on each testing occasion are shown in Table 7. In contrast to the progressive deterioration evident for the demented patients the scores of normal controls (n = 50) improved over the duration on four of the tests and remained approximately the same on the remainder. Although a large number of the demented group (n = 65) had already reached an advanced stage of the illness a further deterioration is clearly noticeable. However, there does not appear to be any dramatic lowering towards the final stages. However the heterogeneous composition of the patient group may have disguised the possible trend of patients with mild symptoms initially to change more drastically than those that had reached a further stage of the illness at the beginning of the study.

Table 7

Psychometric test results over 2½ years of dementia (from Jonsson & Waldton, 1973)
Mean scores on testing occasions 1-5

Test	1	2	3	4	5	Scale of points for each test	
1. Vocabulary	14.2	15.1	12.9	14.5	12.6	0-	+45
2. Word pairs	78.8	75.4	74.4	81.5	82.5	-1-	-120
3. Shape perception	12.4	11.4	10.1	10.8	8.5	0-	+16
4. Picture memory	7.2	6.4	6.7	6.5	5.9	0-	+20
5. Sorting	6.1	6.0	5.0	5.1	4.8	0-	+21
6. Pattern combination	16.5	15.0	15.8	14.7	14.0	0-	+36
7. Naming objects	2.4	2.4	2.5	2.5	3.5	0-	-7
8. Naming pictures	3.6	3.5	3.8	4.3	5.0	0-	-10
9. Pointing out pictures	2.3	2.9	3.2	3.3	3.8	0-	-6
10. Matching pictures	1.8	1.9	2.1	2.0	2.3	0-	-3
11. Reading words	1.6	1.7	1.7	1.8	2.4	0-	-4
12. Reading text	14.3	13.8	20.0	20.8	24.5	0-	-52
13. Reading numbers	2.8	2.8	2.9	3.3	3.7	0-	-6
14. Writing words	3.3	3.4	3.6	3.5	3.9	0-	-5
15. Writing numbers	2.4	2.4	2.5	2.6	3.0	0-	-4

Although it might be argued that the fifteen tests selected by Jonsson and Waldton do not sample all intellectual abilities their results do provide strong support for the notion of generalized progressive deterioration of intellect. What is the underlying nature or central feature of this intellectual change? Is the intellectual change qualitatively different from that of the normal person? Neither of these questions has yet received a satisfactory answer. There is conflicting evidence, for example, as to whether intellectual decline occurs along one (Dixon, 1965) or more (Gustafson & Hogberg, 1975) dimensions. There has been no clear demonstration of what these dimensions are. Eysenck (1945) has suggested that demented subjects might be particularly impaired in 'fluid' intelligence. Likewise Halstead (1943) suggested that the tests showing the greatest impairment were those in which the subject could not use old mental habits and had to adapt to unfamiliar situations or ways of thinking. Other investigators point to the loss of abstract ability and suggest that dements have a strong tendency to group objects concretely and not on a conceptual basis (Cleveland & Dysinger, 1944; Pinkerton & Kelly, 1952; and Hopkins & Post, 1955). However it may well be that the demented subject only differs in degree from his normal counterpart as far as this variable is concerned.

In summary the investigation of intellectual changes in dementia has not attracted a great deal of psychological research. Work with a range of psychometric tests does confirm the existence of marked intellectual deterioration. However the real challenge ofspecifying the underlying nature of that change has not yet been adequately addressed.

Memory

Second only to intellectual deterioration, evidence of memory disturbance is the most marked psychological change evident in dementia. Although not always marked in the earliest stages (Zangwill, 1964; and Wells, 1977) such disturbance is a universal characteristic of the disorder (Miller, 1977). It is explicitly interwoven with the more global clinical phenomena of confusion and disorientation readily observable in the later stages of the illness.

The experimental investigation of memory has largely rested on the study of verbal learning/memory with some interest also being paid to non-verbal retention and work on operant and classical conditioning. The model of normal memory most commonly used in experimental studies is the one that divides memory into a temporary short-term store of limited capacity (short term memory) and a more permanent, long-term, store (long-term memory).

Inglis (1957) was one of the first to show that a main deficit in 'memory disordered' subjects lay in the acquisition of new information, namely paired-associates. The Inglis Paired Associate Learning Test developed from this finding was shown by Inglis (1959) to give a worthwhile level of discrimination between patients with and without clinically evident dementia.

Using Broadbent's (1958) model Inglis hypothesized that a breakdown in the short-term memory store accounted for this difficulty in acquiring new information and the subsequent memory disorder in dementia. The demented subject was in effect failing to establish new information in long-term memory.

Miller (1971, 1972, 1973, 1975 and 1976) re-examined the data from Inglis' experiments and investigated the hypothesis that an impaired short-term memory was not the sole reason for new information not being established in long-term storage. A series of experiments revealed that demented patients showed impairment in their capacity to transfer information between the two storage systems (Miller, 1971a, 1971b and 1973). More detailed analysis of the short term storage deficit indicated that in addition to a deficit in absolute capacity, information is less efficiently coded in STM by demented subjects and has greater difficulty getting into STM because of processing difficulties in the preceding 'input' stage (Miller, 1972 and 1976). Demented subjects appear to require a longer exposure before they start to reliably recall visual material.

The precise nature of the deficit in the long term storage system was investigated by Miller (1975) in an experiment designed to test the relative importance of retrieval as opposed to acquisition difficulties. Three different conditions for recall on a word learning test were examined - straightforward free recall, a recognition test in which correct words were mixed with incorrect words and a partial information condition in which the initial letters of the correct words were supplied. Results indicated that demented subjects and controls were significantly different under recall and recognition conditions but <u>not</u> under the partial information condition. This indicates that patients with early presenile dementia, the subjects used in all Miller's experiments, are able to establish new material in long term storage but can only retrieve that information under special conditions.

The assumption that demented patients recall distant events relatively well has led Warrington and Weiskrantz (1971) to advance two hypotheses as to how this deficit in the retrieval process would affect only recently acquired information, namely (1) that coding is bizarre and information can only be retrieved when the right kind of cue is available at recall and/or (2) that recall is disinhibited and the subject fails to repress irrelevant information unless partial information is given to limit the available choice of response. Neither hypothesis has as yet received definite experimental verification and indeed the underlying assumption that demented patients recall distant events relatively well is open to query. It should also be noted that although the work of Miller has led to a much more detailed understanding of the precise deficits in memory function associated with presenile dementia his results may not be a complete description of the deficits operating in more severe dementia of the senile type.

Indeed a recent paper by Davis and Mumford (1981) provides support for this contention. They examined verbal recall of word lists under three conditions with a sample of elderly severe dements. Uncued recall was compared with cued recall in the form of (i) the provision of the first letter of each ward at the time of recall, and (ii) the provision at recall of the semantic category of each word. It was found that recall was significantly greater for the dements when letter cued than when uncued, but this increase was only the same as that found for the control subjects. The semantic information improved the non-dementing subjects'recall, but failed to act as a cue for the dementing group.

These results pointed to a pre-retrieval deficit so Davis and Mumford went on to train semantic coding in both the demented and control subjects. This procedure did not improve the cued recall of the demented group but did improve the cued recall of the 'forgetful' controls - those control subjects who, though not demented, evidenced memory problems. According to Davis and Mumford this improvement was very similar to that reported by Miller (1975) for presenile dements.

The conclusions of this study emphasize a dysfunction in the processes prior to retrieval for demented subjects. Perhaps as Davis and Mumford suggest their forgetful control group and perhaps Miller's presenile group might fall into a benign memory loss category evidencing retrieval loss which for later dementia turns into a primary encoding deficit. Certainly it would seem that the retrieval deficit hypothesis is confounded by the weak trace hypothesis for older more severely demented subjects.

The effect of cerebral pathology on past memories has been investigated but not with the methodological accuracy of the work just described on recent memory. Ribot (1955) asserted in his 'law of regression' that the most recent memories were the first to be lost in cerebral pathology and that as the condition progresses, so the past memories become affected in inverse proportion to their recency. This law has never really been disputed and the general effect of recency has been agreed by all observers. This may in part be due to an artefact of testing (Williams, 1968). A subject's account of outstanding events in his remote past may have become stereotyped verbal responses rather than true memories. It has been shown that the manner in which questions are put to subjects is important (Williams, 1954). Questions put in such a way that very easy habitual responses could be given produced different results from those which required some definite recollection. Unfortunately attempts to develop more systematic methods of measuring recollection of events occurring in different periods of life have proved unsuccessful (Williams, 1968).

Although there is a body of evidence in favour of the view that remote memories are not as severely affected as recent ones in generalized cerebral disorders (Zangwill, 1950) recent studies in normal aged subjects (Squire, 1974), depressed aged subjects (Kahn et al, 1975) and patients with amnesic syndromes (Sanders & Warrington, 1971; and Warrington, 1971) fail to substantiate the principle of preservation of memory for remote events when memory for recent events is demonstrably impaired.

The effects of dementia on non-verbal memory have not been as extensively studied by psychologists. Tests are available for the measurement of this function (Rey, 1941; and Milner, 1971). Williams (1968) has demonstrated impairment of non-verbal memory in a group of organic though not strictly demented hospital patients. Grossi et al (1977) demonstrated not only impairment of spatial memory span in Alzheimer type patients but relatively greater impairment for spatial as opposed to verbal span. These results were confirmed by Cantone et al (1978) in a study of 90 dements and 90 controls. The most impressive memory disturbance regardless of the location of the atrophic process, was identified as the spatial memory of the Alzheimer and senile dementia group. This is interpreted as indicative of less symmetrical deterioration of the higher cortical functions in these as opposed to other forms of dementia which preferentially effects the "space" functions. As has already been demonstrated, performance IQ is lower than verbal IQ in dementia, so the preferential demise of non-verbal spatial memory is perhaps not unexpected. As will be mentioned later spatial behavioural disturbances might also be expected. On the positive side the work of Cohen (1981) has demonstrated the preservation of memory strategy for non-verbal designs in dementia, despite a reduced efficiency. A Piagetian model of a geometrical configuration with contingent and non-contingent properties was used to establish a hierarchical order of memorial organisation for spatial structures. Although individuals with dementia performed more poorly than age-matched controls, the hierarchy of chosen characteristics reflected a schematic progression in the organization of spatial memory in both groups.

Studies of normal ageing process have shown the superiority of verbal as opposed to visual-spatial memory suggesting that the visual-spatial deficit may not indeed be a special deficit in dementia but rather an illustration of the comparability of ageing and dementing processes.

In summary the investigation of memory changes in dementia has pointed towards deficits at many points in the total memory process. This is not altogether surprising as a degenerative process affecting most parts of the brain should result in impairment in most aspects of the complex functional system that constitutes memory. Total pessimism is not warranted, however, as some residual capacity has been demonstrated for most memory functions in dementia and moreover the capacity of such subjects to perform memory tasks is clearly related to the manner in which the enquiry is conducted.

Conditioning and learning

Demented patients have been shown to be impaired in both classical and operant conditioning. The classical conditioning experiments of Brown et al (1960) and Solyom and Barik (1965) show dements to be both slower in acquiring conditioned responses and to display lower rates of responding. The work on operant conditioning is more equivocal. Whereas both Kiev (1962) and Mackay (1965) found that dements did not condition well Ankus and Quarrington (1972) found that when effort was directed into finding suitable reinforcers, subjects conditioned well and were shown to be sensitive to alterations in the schedules of reinforcement. These three studies were of the laboratory analogue type.

Several more recent studies have applied operant procedures to the management of behaviour in hospital and residential home situations with some success (McDonald & Butler, 1974; Hoyer, 1975; Geiger & Johnston, 1974; and Baltes & Lascomb, 1975). Several eminent authorities have advocated the extensive application of operant procedures with the elderly (Cautela, 1966; and Lindsley, (1964) and others have even gone so far as to suggest that the therapeutic basis of many non-medical treatments is behaviour therapy in general or operant conditioning in particular (Toepfer & Bicknell, 1974; and Woods & Britton, 1977). This literature will be discussed in a later section when it will be examined in relation to the development of therapy procedures for the demented.

Spatial ability

In view of the relatively greater deficit in performance as opposed to verbal IQ in dementia and the greater impairment of spatial as opposed to verbal memory, it is not surprising that spatial disturbances are evident in dementia. The obvious inability of demented patients to handle their spatial environment is one of the most common clinical manifestations of the condition and is often referred to as spatial disorientation.

Williams (1956b) investigated the performance of 60 senile dements on a series of paper and pencil mazes. Very poor performance was evident but practise on the task was demonstrated to bring about improvements. To a lesser extent 'mental stimulation' prior to maze testing also improved performance but the difference was not statistically significant. Poor memory seemed to be an important factor as the effect of practice wore off quickly and intellectual deficits were evident in the way subjects approached the task. Williams describes her subjects as having a tendency to (a) make directly for the goal regardless of instructions; (b) to be overdependent on following lines, (c) to enter blind alleys, (d) to lose track of the task and (e) to be unable to keep more than one command in mind at a time. This paper will be discussed again in later sections as it is one of the first to make specific therapeutic suggestions on the basis of a quite detailed description of observable psychological deficits. As Welford (1977) has pointed out relationships between signals and responses which are not straightforward but require complex spatial transpositions or symbolic translations between perception and action have a disproportionately adverse effect on the performance of older people, which becomes both slower and less accurate. The limitation appears to result from a fall with age in the capacity to effect complex recodings, possibly as a result of a diminished capacity for short term retention. This of course is particularly the case in dementia where mitigation may be made more difficult by reduced capacity to learn new material in the form of the particular recoding required. Thus the disability in spatial performance in dementia illustrates clearly the interaction of a range of psychological impairments including reduced intellectual ability, short term memory and learning deficits, psychomotor slowness and specific perceptual impairments such as visual agnosia.

Language

The first changes are usually a general reduction in vocabulary and range of expression. The speech typically becomes concrete, circumlocatory and repetitive. Dysphasic signs may appear but systematic examination may reveal no general pattern of dysphasia (Ernst et al, 1970). A common difficulty is in naming objects. Lawson and Barker (1968) demonstrated that dements had much greater difficulty than controls in this area and were relatively more impaired in producing less frequent words. Of some interest is the finding that when the use of an object is demonstrated the ability of the demented subjects to name it is enhanced. This has led to speculation that in contrast to nominal dysphasia the dement's dysfunction has an agnosic component. Rochford (1971) has demonstrated that when easily recognized parts of the body are used as objects the naming ability of a demented group is improved but dysphasics don't benefit. Miller and Hague (1975) demonstrated that dements produced fewer words on a word fluency test as compared to normal controls. A significantly lower proportion of the rarer words were produced. However in a second experiment the same authors found that when production time was controlled for the demented group did not show any general reduction in the availability of words or any selective loss of rarer words. Miller (1977) concludes that demented patients, at least in the early stages of the disease, have no loss of words from their vocabulary but they do exhibit a slowness in producing these words.

It is important to note again that in common with his work on memory Miller has consistently used patients in the presenile group who had not yet been considered candidates for institutional care. Although, as has already been pointed out, the dementing process is often not detected and referred for investigation until the later stages it is likely that Miller's samples are primarily drawn from dements in the early or middle as opposed to advanced stage of the disease.

Another language dysfunction evident in dementia is that of perseveration. This will not be discussed here as little is known about the specific characteristics of this in a demented population.

Miscellaneous features

It has been indicated that demented subjects show evidence of perceptual disturbances (Williams, 1956a), distractibility (Lawson et al, 1967) and poor psychomotor performance (Birren & Botwinick, 1951). The latter feature seems to be accounted for by a slowness in execution of movements rather than in decision time (Miller, 1974a).

All the psychological deficits described so far interact in various ways to affect the capacity of the demented individual to monitor his environment, learn from it and control his relationship with it. What then are the gross behavioural deficits that typify dementia?

VII. Behavioural Disabilities in Dementia

Despite the experimental studies demonstrating the cognitive changes in dementia, it is the functional incompetence of the patient that is the main concern in management. A gap exists in our knowledge of special deficits when we come to consider how they are linked to functional competence. This interrelationship is clearly apparent when we consider behavioural problems such as dressing apraxia. Only by a clearer understanding of the link between cognitive deficits and behavioural competence can we hope to develop more effective management approaches.

In considering the nature of behavioural disabilities displayed in dementia this discussion will focus on institutionalized populations. Most work to date is based on such groups and as the primary focus of this thesis is on the management of the demented in institutional care it seems entirely appropriate to restrict discussion to this group.

The literature contains a number of descriptive reports on behavioural disturbances of demented old people, (Rosin, 1977; and Arie, 1978). The general picture described is one characterized by dependency, incontinence, immobility, social withdrawal, wandering, disorientation and confusion. To specify more exactly the nature of these disabilities we can turn to a few systematic studies (Ferm, 1974; and Gilleard et al, 1980).

Ferm (1974) investigated the changes in performance that are associated with different phases of dementia. Thirteen behavioural variables were considered and rated objectively. Each was selected on the criteria of being significant from the point of view of (1) the independency of the patient, and (2) the environmental care necessitated by the loss of his abilities. The correlations between psychometric test scores and the different behavioural rating scale variables were also investigated to test the utility of a test of mental impairment in predicting behavioural disintegration. The behavioural variables investigated were ability to walk, to wash and dress, ability to eat, bladder and bowel control, the ability to communicate, orientation in space, recognition of persons, participation, hobbies, undisturbed sleep and quietness of behaviour. Subjects were evaluated in each of the behavioural variables on a 6-point rating scale. Precise instructions for this screening evaluation were given and the scale values were defined from 1 = completely independent and adequate performance, to 6 = complete lack of activity. The test of mental impairment was a modification of the Isaacs and Walkey (1964) test measuring comprehension, verbal orientation, verbal memory, concentration and paired associate learning. A degree of dementia scale from 1 = no dementia to 10 = severe dementia was derived from the composite score. According to test scores patients (n = 136) were divided into groups with mild (21%), moderate (30%) and grave (47%) dementia.

The percentage distribution of the total group according to different behavioural patterns isshown in Figure 1./

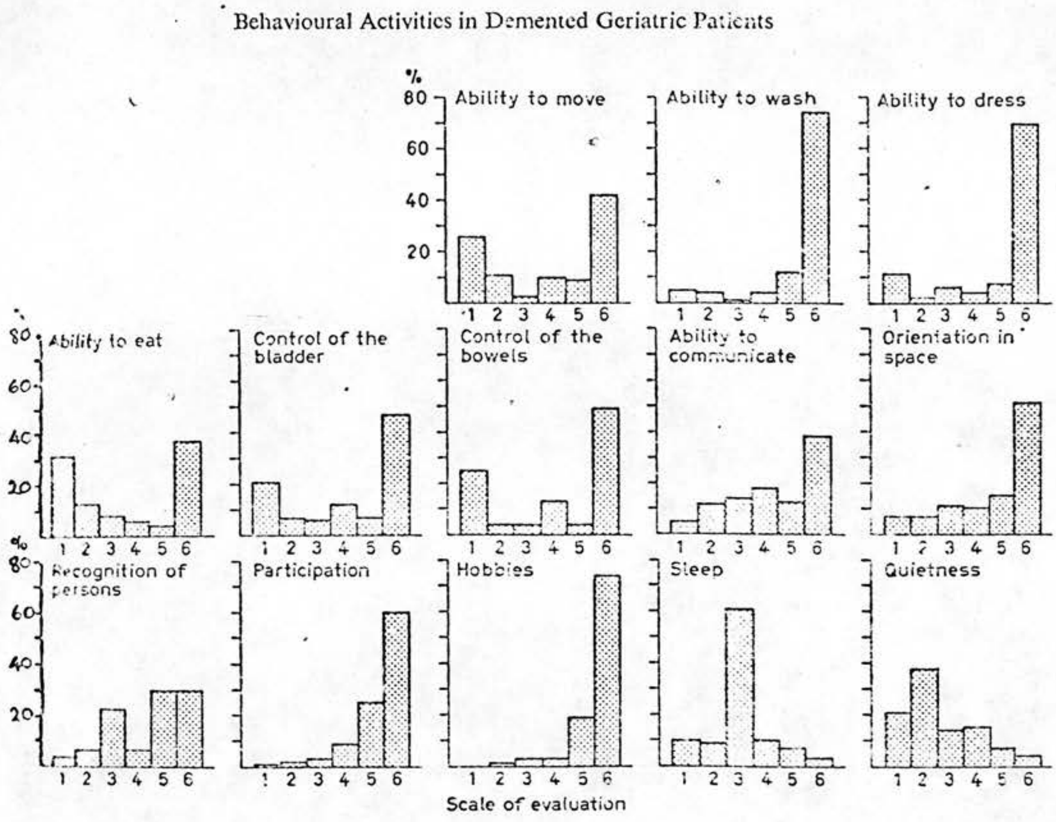


Figure 1. Distribution of the total sample of dements according to different fields of behaviour (n = 136). (From Ferm, 1974).

In most areas of performance such as mobility, ability to eat, bladder and bowel control the distribution was bimodal. It would seem that once complete control of a function is lost, the ability to act will also shortly be lost. In several activities; ability to communicate, orientation in space and participation, the distribution was more linear, thus suggesting that dementia is a gradually developing process in hospital patients.

The mean scores for the different degree of dementia groups on the behavioural rating scale variables are shown in Figure 2. There were differences between the groups in almost all the behavioural variables. The pattern of loss of abilities was remarkably uniform, however, irrespective of the level of dementia. These graphs suggest that independent hobbies are likely to disappear first and participation also tends to be minimal. Second came the loss of ability to wash and dress, whereas orientation in space, ability to communicate and recognition of persons disappeared later, likewise the ability to walk. The ability to eat was preserved longest.

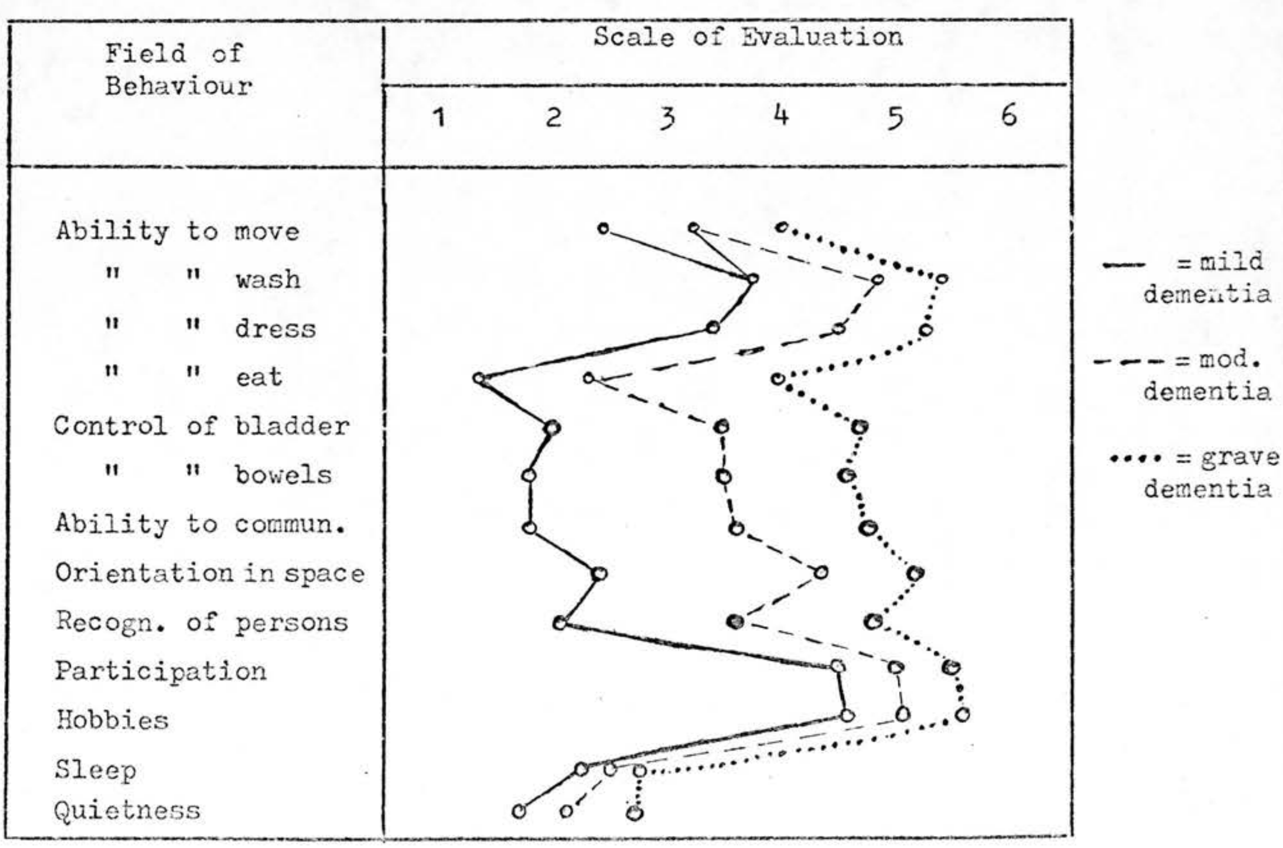


Figure 2. Mean value of three demented groups in different fields of behaviour. (from Ferm, 1974).

The dementia test was shown by Ferm to correlate best with those behavioural activities that are observed to decline gradually during the progress of dementia, such as the ability to communicate, orientation in space and recognition of persons. It correlated less well with activities which tended to disappear at the onset of dementia, such as hobbies and participation, and similarly, with activities preserved until the last phases of dementia. Of course factors other than dementia affect a patient's level of behaviour and activity and this weakens to some extent the relationship between the results of the dementia test and these behavioural rating scale variables.

Although the design of this experiment could be critized for being cross-sectional as opposed to longitudinal the results do suggest that behaviourally dementia in the elderly follows a set pattern. The disorganization shows a similarity to autogenic development, in reverse order: things learned late in life disappear first and those learned early are the last to disappear. A similar reversal of ontogenic development has been suggested by Katz (1964) and as noted earlier in this chapter similar observations have been made relating to the disorganization of memory (Ribot, 1955) and intellectual functions (Hopkins & Post, 1955; and Azuriaguerra & Tissot, 1968). The results of Ferm's work also show that a psychometric test of mental ability made it possible to classify demented old people reliably into different degree of dementia groups. Others, notably Pattie and Gilleard (1978 and (1976), in this country have presented convincing support for this hypothesis by demonstrating a close relationship between assessed mental competence on the Clifton Assessment Schedule and the level of behavioural competence. The prognostic value of such tests has been stressed by Gilleard (1980) who pointed out that they represent the most economical way to gauge the likelihood of a person being confused much of the time, finding their environment too demanding, of developing increasing disabilities in the areas of dressing, caring for own appearance, developing incontinence, etc.

To argue for such a 'central factor' of mental competence in dementia it is not, however, necessary to see dementia exclusively as an organic process. While recognizing that organic pathology in some cases determines almost entirely the course of the disease the involvement of psychological and social factors is evident. These will be discussed in detail later but for the present one example can be drawn from a second study by Ferm (1976). In a longitudinal study of 124 elderly patients entering psychogeriatric care, most of whom were demented, she found that most were either behaviourally independent and self-sufficient or required only minimal care and assistance in everyday activities at the time of admission. After one year, however, a large proportion of the demented subjects had become totally helpless and bedridden but no equally drastic deterioration had occurred in intellectual abilities. In a similar vein Brody et al (1971) has demonstrated that behavioural disabilities exist in the mentally impaired elderly which are in excess of what would be predicted from a knowledge of their actual cognitive impairment. These excess disabilities can be effectively treated.

The prevalance of behavioural disabilities within different types of institutional setting has been established (Pattie et al, 1979; Gilleard et al, 1980; and Masterton et al, 1979). Psychogeriatric hospital populations show higher levels of behavioural disability than residential home populations. The biggest differences appear to be in the areas of incontinence, confusion, need for supervision and communication problems, i.e., the behavioural consequences of cognitive impairment associated with dementia. Other physical abnormalities such as sensory deficits and ambulatory problems do not discriminate between the two populations (Gilleard et al, 1980). Considerable behaviour impairment exists in residential home populations and it has been argued that there has been an increase in the average age and disability of this population in recent years (D.H.S.S., 1977; and Wilkin et al, 1978). Masterton et al (1979) on the basis of psychometric test results estimated that 27.1% of the residents of 11 homes in the area serving Gartnavel Hospital in Glasgow showed clear evidence of dementia. With a less conservative interpretation of their results these investigators estimate that the true prevalence of organic cerebral impairment could be as high as 66%. Whatever the exact figure, and this will vary to some extent from region to region, a sizeable minority of demented old people are being cared for within social service homes and extrapolation of population trends might lead to a prediction that this 'minority' will in the near future become a majority (Gilleard et al, 1980). Within psychogeriatric hospital settings the majority of patients already fall in the category of dementia.

Finally it is possible to finish this section on a more hopeful note. Arie (1978) has stated that much of the apparently chaotic, incomprehensible and repugnant behaviour of the demented is not wholly unintelligible if one sees it as a "manifestation of the anxiety of people who can no longer rely either on their capacity to deal appropriately with stimuli from the world around them, or on the accessibility of their store of learnt information". He makes the plea that we should attempt to see the world through the eyes of the demented person. Then, he suggests, their behaviour is more likely to appear as a purposive attempt to make sense of the strange and frightening world about them. According to Arie:

> "the way in which we treat the confused (demented) interacts with their objective handicap to produce a pattern of behaviour which is the consequence of both.... Even lasting confusion can be mitigated, often dramatically, by attention to the way we treat those who suffer from it, and to this end it is necessary to construct a satisfactory social and physical environment."

VIII. Psychosocial Factors in Dementia

Strong correlations have been demonstrated between various radiological and neuropathological variables and degree of cognitive and behavioural impairment in dementia (e.g., Blessed et al, 1968; and Gosling, 1955). There is no doubt that the psychological manifestations of dementia are related to these organic changes and few would deny a physical basis for the disease. A causal explanation has yet to be evolved but when it appears it is unlikely to be psychological in nature. However, psychological and social factors may influence the manifestation of dementia.

It has been clearly established that the vast majority of persons with dementia are not institutionalized (Bergmann et al, 1965; and Kay et al, 1964). There is no clear evidence to suggest that those in institutional care are a more demented group but they do differ from their fellows in suffering more from sensory impairment, physical illness, poverty and social isolation (Kay et al). Clearly it is the interaction between multiple variables that generates functional dependency. Several psychosocial factors have been implicated but the nature of their interaction is not clearly understood. Broadly, two classes of overlapping factors can be identified. The first relates to the influence of factors associated with residence in the community on functioning and the second, the effects of relocating into an institutional setting.

In the community the presence of a social support system is of primary importance. It is well known that the widowed, divorced and never married are more likely to be institutionalized (Ross et al, 1976). The presence of a support system can prevent the appearance of self-neglect. The assistance offered can vary from verbal reminding, where there is a decline in the ability to take initiative, to develop intentions and to construct and carry out verbal plans through to complete physical care. Where support comes from the family or spouse the emotional response of the provider shows considerable variation (MacMillan, 1969). A mild degree of impairment can arouse great emotional response in some families, while others are oblivious to far greater deficits. The capacity of the supporter to provide services will also be influenced by their age (Sanford, 1975) and the extent of the burden on them (Brocklehurst, 1977; and Krause et al, 1976). Supporters also vary in their capacity and resourcefulness to cope with a somewhat dependent individual. Blumenthal (1979) points out that many are clever in finding schemes to maximize an elderly person's function while others inadvertently set up paradigms guaranteed to make him fail. Although there appears to be no hard evidence available, several authorities have suggested that placing demands on the demented person which he either cannot understand or comply with, creates anxiety which leads to further behavioural decompensation and increased supporter frustration (Blumenthal, 1979; Arie, 1978). Alternatively premature dependency has been postulated to occur when supporters place too little demand on the demented person's behaviour.

Closely related to the social support factor is the role of social isolation in the manifestation of dementia. It is well established that sensory stimulation is a pre-requisite for normal cortical function (Luna, 1973) and there have been suggestions that isolation for some elderly leads to behaviour patterns associated with poor social adjustment and cognitive function (Bennet, 1973), loneliness, restriction of interest, apathy and lack of initiative (McMillan, 1969). Unfortunately, what evidence there is in favour of this view is equivocal. The higher admission rates for isolated individuals could be accounted for equally well by breakdown in the social support factors described above. Bennet (1973) demonstrated lower intelligence scores for isolated individuals on the waiting list for institutional care when compared to new admissions and "old-timers" in care. However, Lieberman et al (1968) have shown, in studying the effects of institutionalization, that many changes often ascribed to living in an institution, are set in motion by the decision to enter an institution. Effects of isolation can also be confounded with the effect of certain life events associated with psychological loss such as widowhood.

Amster and Krauss (1974) identified 'life crises' in a sample of 25 dements and 25 controls over a preceding five year period. They found the incidence was about double in the demented group. These results can be interpreted to suggest that dementing illness may in itself bring about more crisis situations or that with dementia a patient becomes less able to cope with the stresses and strains in normal life and these may be elevated to the level of a major crisis.

Although it may be reasonable to suppose that the important motivational impetus supplied by 'significant others' can result in a higher level of cognitive and social function it is stretching available evidence to suggest decrements in such functions in the socially isolated can be accounted for by a sensory deprivation model. Moreover, although the loss of roles through retirement, widowhood and other social changes may be conceptualized as reducing stimulation below optimal levels, a more parsimonious explanation of the role of such changes would surely point to the withdrawal of social supports and the ensuring psychological reactions to such losses. Closely related to the idea of social isolation and sensory deprivation is the concept of low arousal. Post (1966) has suggested that demented patients have a lowered level of cerebral excitation and this might be related to cognitive changes, especially memory. The corollary of this, like that of sensory deprivation, is that functioning may improve if the general level of background stimulation is enhanced. Bower (1967) offers some evidence that enriched environmental experience for patients with senile dementia does result in improvements.

The influence of institutional care provision on the behaviour of the demented old person has also attracted considerable interest. Many studies suggest that institutions have deleterious effects on the psychological well-being and physical survival of aged adults. Liebermann (196) in reviewing these studies, however, concludes that many of the effects attributed to living in institutions can be explained on the basis of population differences between those living in the community and those residing in institutions. Thus life in the institution per se may not determine but merely correlate with the observed effects. Certainly Shanas (1961) has made the point from survey data that the majority of institutionalized aged have real needs they are attempting to solve via the institution.

The effects of environmental change brought about by movement from community life to life in an institution has been studied as has the effect of relocation from one setting to another. A pattern of both negative and positive findings emerges from data which often lacks precision in defining the type of aged affected and the conditions involved. There is evidence that the conditions associated with moving into an institution create many of the effects attributed to living there (Libermann, 1968). Most studies show that changing the environment sharply increases the death rate (Goldfarb et al, 1966; and Blenkner, 1967). However, these studies do not relate specifically to demented individuals and the relationship between dementia and early mortality has already been well established by others (Roth, 1952).

There is evidence to suggest that the mentally impaired are more vulnerable to environmental change and that cognitive intactness is associated with improvement under relocation (Goldfarb, 1966; Donahue, 1965; and Carp, 1967). Little is known, however, about the specific effects of environmental change on demented patients. Blumenthal (1979) points out that overlearned routes and patterns are retained the longest by demented people and that relocation seriously disrupts this process. The so-called social breakdown syndrome has been taken as the analogy to this (Gruenberg, 1967). For example, Blumenthal talks of discordance between environmental demand and individual capacity and relates this to reduced functioning. Libermann (1968) suggests that the larger the difference between old and new situations the greater the possibility that the aged individual will need to develop adaptive responses often beyond his capacity. Lawton (1968) takes this position further and in his "environmental docility hypothesis" states that the individual is more susceptible to environmental influence as his competence diminishes. Those of lowered competence, which surely would include dements, require homogeneous environments. However, Lawton rightly points out that little is known about the acceptable limits or parameters of environmental complexity for different groups. Lindsley (1965) prescribes the notion of the prosthetic environment as one that is specifically designed to fit in with behavioural limitations. The consensus of opinion, therefore, although unfortunately often only of a speculative nature, is that special environments are required for the demented elderly. The characteristics of such environments have not been established but two dimensions have been postulated - the degree of stimulus complexity present and the degree of behavioural prosthesis. These, it is hypothesized, should be made "congruent" with the functional characteristics of the population being served (Lawton, 1970).

If this general model is accepted it becomes all the more essential to establish refined assessment techniques to describe the range of functional variation in any given population (Lawton, 1970) and to establish how homogeneous or heterogeneous such populations should be. Furthermore it may be possible to systematically measure environments for their degree of stimulus complexity and behavioural prosthesis.

In conclusion the behavioural competence of those suffering from dementia is determined by two general factors - the cognitive deficits that accompany the dementing process and the structure of the environment they live in. Further consideration of the environmental factor is provided in the next chapter.

Summary

Dementia or organic cerebral impairment has been shown to be a classifiable set of disorders which affect a growing number of elderly people. Although early diagnosis and effective screening of these conditions is still a problem accurate classification can be achieved by monitoring the progressive changes in the clinical picture. A number of definitely treatable conditions have been isolated and the progressive changes that accompany the so-called 'irreversible' conditions have been described.

The cognitive and neuropsychological deficits that characterize dementia have been shown to be diverse, progressive and linked to a number of behavioural impairments. The exact nature of the relationship between cognitive deficit and behavioural impairment is not clearly understood. No simple one to one relationship exists between the degree of disability in these two spheres of functioning, or indeed between these and the degree of ascertained neuropathology.

The nature of the disabilities evident in dementia have numerous implications for management however. Arie (1978) has pointed out that "the normal apparatus for monitoring one's environment, learning from it and controlling one's relationship with it is disrupted." Management strategies should therefore consider how environments can be rearranged to compensate for defects in this 'apparatus'. Our knowledge of these deficits provides us with some leads as to the nature of such a prosthetic environment. Given the impairment in general intellectual ability the environment should be simplied and provide relevant information to the patient. Relevant stimuli or cues should be presented in a fashion that the dementing patient can comprehend and separate from irrelevant stimuli. They should be strong enough to compensate for low arousal. The cues should be those that facilitate behaviour as performance deficits are prominent. These can be provided both by the care staff and in the physical environment itself. Take, for example, incontinence: the staff member simply asks or 'cues' the patient to go to the toilet, thus compensating for a possible deficit in recognizing this need. The toilet ideally should be close to the living area so (a) the route is simplified and shortened to reduce demand for complex spatial behaviour, and (b) the patient is less likely to forget where he is going en route. The toilet should be marked with a large clear three dimensional signpost visible from a distance. This sign contains verbal and pictorial information in case the patient has an agnosic deficit for words or pictures. The patient's dress might be simplified if there is an apraxic deficit or gross psychomotor slowness.

Our knowledge of cognitive and neuropsychological deficits, therefore, gives us some general guidelines on how cues are presented. Concrete as opposed to abstract information should be used. This calls for simple sentence structure. Information should be presented slowly, and at a pace controlled by the patient. In presenting cues verbally staff should therefore speak slowly so that the patient can process the information and provide only a little bit of information at a time. The information in the physical environment is permanently available but if attentional or visual agnosic deficits are evident the patient might need to learn to pay attention to such cues. Learning has been shown to occur in dementia with proper attention to the relevant acquisition variables of number of trials, i.e., repetition, enhancement of stimulus and personal reinforcement. Recall deficits can be tackled by providing partial information as a prompt for recall of previously learnt information.

Thus at least the environment itself should be capable of taking over responsibility for assisting a patient to monitor that same environment and maintain some control over his relationship with it. This in itself would be beneficial and there is the added possibility of such an approach facilitating learning and thereby greater self-monitoring and control.

CHAPTER 3. A REVIEW OF PSYCHOLOGICALLY BASED INTERVENTION STRATEGIES IN DEMENTIA

The term 'treatment' has been deliberately avoided above as it might mislead the reader on a number of counts. Firstly, use of this term might serve to imply that dementia was somehow reversible. Secondly, given the normal use of the term, the reader might assume that 'treatment' involves the application of certain procedures on a time-limited basis. Lastly the reader might rightly wish to debate the utility of 'treating' an organically based condition in a psychological fashion. Use of the term intervention is somewhat less grandiose and is a more apt reflection of the general aim which is to ameliorate the effects of dementia and help the patient cope with his deficits. The hypothesis running throughout a lot of the work on psychological 'treatment' in dementia is that although the condition is organically caused the manifestation of the resulting impairments can be influenced by manipulation of psychological factors. Just such an hypothesis has been extensively verified over the past twenty years in work with the mentally handicapped.

At most the goal of psychological intervention in dementia is to slow down the progressive loss of function associated and help the individual directly, or through modification of his environment, cope with his remaining deficits. It is accepted that such changes will often necessarily be slow and often minimal but as Blumenthal (1979) points out they may make the difference between an individual being able to cope or not able to cope in a given situation.

There have been several recent reviews of psychological approaches to the management of dementia (Hodge, 1977; Miller, 1977; Woods & Britton, 1977). All point to several acknowledged difficulties in evaluating the available literature. Firstly there is a relative dearth of controlled trials, secondly the populations studied are often not adequately described and lastly the design and methodology of some trials are quite inadequate: frequently the intervention procedures or measurement techniques used are not described in sufficient detail.

Another feature of management approaches which deserves consideration is the frequent absence of a sound psychological rationale for the interventions applied. The reason for this seems to be a tacit recognition by some investigators that the environments in which the dementing are cared for often show as many deficits as the dementing patients themselves. The cognitive and behavioural deficits associated with dementia have already been described so some consideration should be given here to the frequent environmental deficits that are evident.

Psychogeriatriccare facilities are frequently custodial in nature with a primary ethos of looking after the dementing patients' physical needs (Brudno & Selzer, 1968). The environment is designed to be functional, i.e., facilitate the provision of physical care. As units typically house a large number of patients who are looked after by a small number of staff the emphasis is often on developing an efficient routine which allows procedures to be carried out quickly. The physical demand of the work is reflected in consideration being given primarily to the needs of the staff. As gravely demented patients are frequently doubly incontinent and behaviourally disruptive the decor and furnishings provided are also selected with a view to being functional, i.e., not easily damaged, easily cleaned and not liable to show up mess. In many settings the patients' clothes are selected to meet similar criteria. Typically walls are painted a uniform dark colour, seats are arranged around walls for the ease of access of staff, and, for speed and efficiency, staff look after the physical needs of the patients at set times. This has been referred to as a "resource-sparce" environment by Pincus (1968).

While recognizing that there may be considerable variations across settings the above picture is not an exaggeration for many. Staff rarely seem to have time to speak to patients, and when time is available free of tasks, staff typically seek out each other's company rather than that of patients (see Savage, 1976). The typical staff member is an untrained nursing assistant and staff turnover is frequently high as the job has low status and is physically demanding. Few would describe the patients as having much 'quality of life'. Some might associate such conditions with the concept of institutional neurosis as described by Russell Barton for schizophrenia. It is not surprising that given this therapeutic nihilism many psychological intervention studies, especially the earlier ones, have tackled these general deficits in the care environment rather than the specific deficits of dementia. In fact as we have noted earlier the nature of the occurrence of cognitive and behavioural deficits in dementia may be intimately interwoven with environmental factors. However many studies have had as their goal an improvement in the quality of life rather than amelioration of these psychological deficits.

The main studies to date are listed in Table 8. Three groups of studies emerge: (1) studies concerned with Behaviour Modification; (2) studies concerned with Reality Orientation; and (3) studies concerned with a variety of techniques based on activity, social interaction, occupational therapy, "stimulation", recreation, combinations of these and occasionally including components of behaviour therapy and reality/

Table 8

Review of Psychological Intervention Studies

Nature of Intervention	Author
1. Miscellaneous Studies:	
Rearrangement of furniture - effect on social behaviour	Sommer & Ross (1958)
Adjustment of lighting - effect on nocturnal delirium	Cameron (1941)
Activity programmes - general impressions of	Salter & Salter (1975)
Socialization therapy - general impressions of	Rathbone-McCuari et al (1975)
Activity programmes - effect on pat. behaviour	Reichenfeld et al (1973)
Intensive activity programme - effect on patient behaviour	Pappas et al (1958)
Intensified stimulation - effect on cognitive and social behaviour	Loew et al (1971)
Sensory training - general impressions of	Richman (1969)
Regular physical activity - effect on self care and daily activity	Clark et al (1975)
Wine - on interpersonal behaviour	Kastenbaum et al
Patient determined activity programmes - impressions of domestic, social and craft activity - effect on behaviour	Cosin et al
Milieu therapy - effect on ward adjustment	Steer & Boger (1975)
Structured stimulation (discussion groups) - effect on social behaviour	Bower (1967)
2. Behavioural Studies:	
Structured group discussions with rewards - effect on social skills	Wisocki et al (1976)
Stimulus control and immediate reinforcement - effect on eating	Baltes et al (1976)
Prompting and reinforcement - effect on independent walking	MacDonald et al (1974)
Behaviour therapy of incontinence	Pollock et al (1974)
Individual treatment - effect on excess disabilities	Brody et al (1971)
Resocialization - a behavioural approach	Mueller & Atlas (1972)
Token economy - effect on behaviour	Mishara (1971)
Shaping incompatible behaviours - effect on screaming	Baltes & Lascomb (1975)
Programmed recreation - effect on purposeful activity	Quilitch (1974)

Stimulus/

Table 8 cont.

Nature of Intervention	Author
Stimulus control - effect on social activity	Quattrochi-Tubin et al (1980)
Design of living environments - effect on participation	McClannaghan et al (1975)
Indoor gardening - effect on engagement	Powell et al (1979)
Optional activities - effect on participation	Blackman et al (1976)

3. Reality Orientation Studies - see Table 11, page 109.

orientation. This group of studies seems to defy a more rational classification as the three review studies listed, although agreeing on the behaviour therapy and reality orientation approaches, fail to agree on how to categorize this third group. Table 9 illustrates this dilemma.

Table 9

Breakdown of intervention studies by three reviewers' descriptions

	Behav. Mod.	RO	Stimulation & activity	Milieu	Ergonomics	Normalz.	Not categ.
Hodge (1977)	/	/	/				
Miller (1977)	/	/			/	/	/
Woods and Britton (1977)	/	/	/	/			

As much of the early work falls into this third heterogeneous group of studies this review starts with those which we shall describe as studies concerned with activity and stimulation.

I. Studies Concerned with Activity and Stimulation

Cameron (1941) was one of the first workers in the field. He examined the nocturnal confusion and wandering shown by some dementing patients and demonstrated that the same disorganized behaviour could be reproduced in daytime by placing the patient in a darkened room. This is an important study for two reasons, firstly it demonstrated that an undesirable symptom of dementia was related to environmental stimulation and secondly it demonstrated that the symptom could be brought under environmental control.

In a similar vein Sommer and Ross (1958) showed that levels of social interaction were related to the parameters of seating arrangements in a ward where two-thirds of the residents were demented. By arranging chairs into small groups around tables, instead of the existing practice of having long lines of chairs round the walls they demonstrated a 60% increase in verbal interactions between residents. The number of 'sustained' interactions increased more than the 'brief' interactions but there was no change in the number of participants in each interaction, the vast majority of which occurred between two ladies. Although it may be argued that reduced social interaction is not a primary symptom of senile dementia this study, like that of Cameron, illustrates the link between environment and behaviour in demented patients, and points to the influence of environmental deficits ascopposed to cognitive deficits in determining levels of behavioural competence.

The first studies of intensive combinations of treatments were reported by Rechtschaffen et al (1954) and Atkinson et al (1955). Unfortunately, like some studies that were to follow later these investigators relied on comparing hospital discharge rates with earlier figures from before the initiation of treatment. They made the suggestion that intensive treatment increases the hospital discharge rate of geriatric patients. More reliable measures of outcome were utilized by Cosin et al (1958) who looked at the efficacy of various social and occupational therapies applied in sequence with demented patients. These activities were reported to stimulate patients towards more appropriate behaviours and increased intercommunication but the effects were short-lived dropping away shortly after therapeutic stimulation was discontinued.

They interpreted this to indicate that deterioration of communication ability was not the main source of deteriorated behaviour but rather that "drive" and "self-motivation" had become defective.

Pappas et al (1958) also applied an intensive combination of treatment activities, this time with a large sample of geriatric patients of varied diagnoses. In this study ward aides and volunteers, in addition to occupational and recreational therapists, were employed to provide a wider range of activities related to the interests and abilities of individual patients. This is one of the first studies to employ experimental and control groups and utilize a behaviour rating scale. Overt behaviour, as measured by this scale, was not affected by intensive treatment. However ideation, orientation and emotional tone were greatly improved for the experimental patients with the control patients becoming worse. Some 50% of the total sample of 266 patients were diagnosed as "chronic brain syndrome with cerebral arteriosclerosis" or "chronic brain syndrome with senile brain disease". The other 50% were diagnosed as suffering from schizophrenia and affective disorders. All patients in the experimental group, irrespective of diagnosis were improved to the same degree. Those in the control group with an organic diagnosis became worse with no change evident for the functional disorders. Pappas et al conclude that the nature of the disorder is not an index of the response to intensive treatment and note that, in their opinion, the most important single aspect of the treatment programme was that provided consistently by the ward aides. Although criticism could be levelled at the choice of behaviour rating scale (the Lorr Multidimensional Scale) and the absence of any data on reliability of measurement, this is a sophisticated study for its time and many of the conclusions drawn are reiterated in later work. However it is impossible from the data presented to tease out exactly how much improvement was experienced by the dementing patients in the group.

The results of Cameron (1941) prompted Inglis (1962) to suggest that some of the behaviour of dementing patients bore a relationship to some of the behaviour exhibitied by people subjected to experimental sensory deprivation. Cameron had suggested from his work with nocturnally confused patients, all of whom had severe deficits in recent memory, that their behaviour was maybe due to spatial disorientation brought about by their "inability to maintain a spatial image without the assistance of repeated visual stimulation". He demonstrated that these patients did show marked spatial disorientation in their memories of the position of objects round about them after they had been blindfolded for some time. Inglis related these findings to the phenomena associated with experimental sensory deprivation in which volunteer subjects demonstrated signs of impairment in thinking and learning, irritability and occasionally hallucinations. Inglis, however, in drawing the parallel between the behaviour of dements and sensorily deprived subjects cautioned against the overloading of demented patients with stimulation as this might call on other capacities which are also impaired in the demented elderly.

Hodge (1977) has commented on the probable oversimplicity of this sensory deprivation model on three counts: (1) it is an attempt to essentially explain a state of chronic deprivation, perhaps lasting years on the evidence from acute experiments on sensory deprivation which last no more than a few days at most; (2) it does not account for the great many old people who suffer quite severe sensory impairment without apparently being demented, although of course there could be an interaction between reduced sensory capacity and recent memory deficit of the type suggested by Cameron, and (3) the sensory deprivation hypothesis implies that the effect is brought about by increasing sensory thresholds. Davis et al (1971) have shown however that unstructured visual stimulation has little beneficial effect on people suffering from sensory deprivation, but if coupled with social contacts some of the deleterious effects were ameliorated. Hodge hypothesizes that the kind of sensory deprivation suffered by dementing patients may involve a "deprivation of structured sensory input due to multiple neuro-psychological impairment such as agnosias and dysphasia".

Bower (1967) however developed an approach based on the sensory deprivation hypothesis. His rationale was based on the hypothesis that dementia may have a dual aetiology; that it is the result of both organic and psychological factors. He suggested that the initial behavioural changes in early dementia were due primarily to organic lesions, noteing that there was evidence of a reduction in cerebral oxygen consumption in dementing people suggesting reduced activity of the brain. In time, proposed Bower, these changes reduced the person's capacity to respond to environmental stimuli. At this point the environment begins to make fewer demands on the person and the person may also start to withdraw from social and environmental interaction. As this happens fewer stimuli impinge on the brain and fewer responses have to be made. Bower goes on to suggest that this state of essentially sensory deprivation leads to further organic changes which he calls "disuse atrophy", and thereby accelerates the progress of the dementia. As the psychogenic component is the one most likely to be reversible Bower argues, unlike Inglis, for a management approach based on intensive sensory stimulation.

In an experiment designed to test this hypothesis Bower compared an experimental group of 25 female demented patients who received intensive "structured stimulation" with a control group of 25 female dements who received institutional care. The "structured stimulation" so provided is not well described but seems to have taken the form of about $4\frac{1}{2}$ hours per day of occupational, domestic and group activities, exercises, make-up, films, quizes, games, hobbies, industrial therapy and religious services. As compared with the control group the stimulated patients showed some changes in psychiatric state and in ratings made by occupational therapists. This beneficial effect tended to dissipate over the weekend rest period and Bower condludes that to be therapeutically effective, stimulation has to be consistent and of long duration.

Two further studies attempting to evaluate the effects of intense and diversified stimulation followed closely after Bower. Loew and Silverstone (1971) employed a programme of intensified sensory input and response facilitation with very old patients, average age 86, in a geriatric hospital. These patients were described as "senile" but no more specific description is given. A controlled design was employed with 14 patients in both the experimental and control groups. The 'stimulation' received by the experimental group which was located in a separate ward from the control group, took the form of: (1) A modified physical environment - the ward was redecorated in bright colours with paintings, mobiles and curtains hung. Live plants were placed on the windows and family pictures and other personal items placed by patients' bedsides. Large clocks and calendars were installed and regular auditory stimulation was achieved by regular sessions of phonograph and accordian music. Patients were encouraged to exercise their hands and arms and touch, smell and taste objects long missing in their lives, e.g., dough, wine, flowers, etc. (2) A modified interpersonal environment - staff were consistently encouraged to engage the patients in intellectual tasks such as telling the time and solving simple jigsaw puzzles. Some patients went to a sheltered workshop. A Rabbi introduced religious services and volunteers were utilized in a programme of bedside visiting. Attempts were made to have the patients eat in groups and leave the ward for outside activity. Additional staff were assigned to the ward to allow more time for encouragement of patients in daily living activities. The amount of extra stimulation received by patients was estimated at between 1-3 hours excluding of course the stimulation received from the physical environment.

Quantitative measures of cognitive function, affective state and social attitude together with behaviour ratings were taken before and after the six month intervention period. Non-significant improvements on a mental status questionnaire and digit span test were noted for the experimental group. The Energy Scale (Loew & Silverstone, 1969) designed to measure intensity of affect in relation to daily activities showed the experimental group to be more active (vs. passive) in their overall involvement with the social and physical world. The Oberleder Scale, designed to measure attitudes towards growing old, showed non-significant improvement but the Ward Behaviour Scale (Burdock and Hardesty, 1968) showed significantly more "psychopathology" in the form of critical, demanding and challenging behaviour from the experimental group. Loew et al point out that this change may be healthy for a regressed, deteriorated geriatric population and indicate that the stimulation programme had provoked the motivation to seek further changes in an unsatisfactory environment. This was backed by the improvements evident in social orientation, interest, participation in activities and responsiveness to staff as measured by the Oberleder Attitude Scale. This interpretation is perhaps over-speculative but is backed up to some extent by the work of Kleban et al (1971) who showed that aggressive attitude was linked to positive responding to therapeutic manipulations.

Richman (1969) describes a procedure for increasing sensory awareness which evolved to meet the needs of that proportion of senile dements who did not qualify for the traditional therapeutic activities at Bronx State Hospital, New York. Severe psychomotor retardation and deficits in discrimination between and responding to environmental stimuli combined with prominent perceptual-motor deficits prevented the prescription of the usual occupational therapy tasks. Drawing on the work of Ayres (1962) and Rood (1962) with children Richman postulates that sensory discrimination can be trained and greatly developed by practice. This in turn should improve capacity for effective behaviour. The procedures detailed by Richman emphasize the need for stimulus variety and focus on all areas of perception such as those concerned with sensory mechanics of posture, body image, form perception, space discrimination, stereognosis, recognition of texture, size and structure, training in auditory listening, visual (looking) and kinesthetic cues. Sensory stimulation was provided in an orderly way with each sense worked with in turn. This was achieved in a small group situation where additional social and cognitive functions were tapped. As well as completing sensory exercises patients introduced themselves, verbalized their responses and the therapist orientated the patients to where they were and what was going on.

Although no empirical data is presented to determine treatment effect Richman notes examples of short-term clinical improvement.

This paper is of interest in that the sensory stimulation provided was highly structured and the underlying premise was that patients need special training to adequately process sensory information. In contrast the studies of Bower (1967) and Loew et al (1971) emphasize natural multisense stimulation provided through organized purposive activity without need for training in sensory discrimination.

There has been no further elaboration of the sensory deprivation model of dementia although the implicit assumption in many studies related to behaviour modification and reality orientation is that stimulation from the environment, albeit managed in different ways and with different rationales is the common denominator of all intervention strategies with the demented elderly.

To compare this review of studies which fall into a broad "miscellaneous" category brief mention should be made of work by Reichenfeld et al (1973), Salter et al (1975), Rathbone-McCuan et al (1975) and Lewis (1975). Reichenfeld et al evaluated the effect of an activity programme on a psychogeriatric ward. Four wards were compared, two of which served as controls (units B + C), one as a unit where various activities were introduced (unit D) and the fourth (unit A), although intended as a control ward, received some activity programming from another source. Activities on ward D involved "classroom" sessions where participants of unspecified diagnosis and number worked on cognitive tasks and engaged in topical discussions on a number of subjects. Additionally, nursing staff directed daily physical exercises, the hospital chaplain held a weekly service and an art therapist conducted a highly structured art therapy class. Daily recreational activities were provided in the form of ball games, carpet bowling, etc. The duration of this programme was approximately six months. There was no pretest but the four wards were compared on posttest on the criteria of admission and discharge dates, status on discharge, attitude of staff and functioning of patients on the Physical and Mental Impairment-of-Function Evaluation of the Aged Scale (PAMIE), (Gurel, 1972). Ward D had a higher discharge rate, more patients were in the 'improved' category on discharge and on the PAMIE categories of 'Behavioural Deterioration' and 'Bedfast-Moribund' Ward D patients were significantly better than patients from the other three wards. The staff on Ward D were shown to be significantly more activity orientated on the 'Custodial-Activity' scale of a specially constructed Geriatric Attitude Scale. The absence of a pretest measure severely limits the interpretation of this data as it is not possible to compare the four wards prior to the implementation of treatment. Although admissions to these four wards were made on a rotational basis from the hospital's catchment area, the presence of some systematic bias cannot be excluded especially in the area of staffing and there is not way of measuring the precise effect of the intervention programme. Moreover like several of the other studies under discussion this paper gives no indication of what precise factors lead to improvement.

Salter and Salter (1975) examined the effects of an individualized activity programme on elderly patients of mixed diagnosis who had a mixture of psychological and physical impairments. A team approach was emphasized and in what bears a striking resemblance to the reality orientation approach patients on the experimental ward were provided with orientation classes, environmental stimulation in the form of permanent visual aids, retraining in activities of daily living (ADL) and recreation. No control group was employed and no empirical data presented. Subjective improvements were reported in orientation and overall outcome. Although the recording procedure was not described 76% of the patients were noted to participate in educational and recreational activities after four months compared to 14% initially. Many of the patients were reported to function better in the areas of dressing, speech, continence and mobility. Again due to obvious flaws in the methodology of this study neither can the exact extent of improvements nor the precise factors involved be ascertained.

Rathbone-McCuan and Levenson (1975) describe a socialization approach based on the notion of social role performance. Previous work (Rathbone-McCuan et al, 1972) had established that the social role performance of geriatric patients, in the form of social interactions with relatives, friends, etc., bore no direct association with levels of functional impairment and was characterized by loss of roles available earlier in life vis, parent, spouse, homemaker, etc. The programme set out to create new roles, re-establish aspects of former roles and/or substitute for role losses in a group of geriatric patients attending a day centre. This was attempted through the introduction of activities that involved small group interaction. Each group included participants with various levels of physical and mental impairment. No more specific description of the patient group is provided and the evidence for the effectiveness of the procedures is limited to the impressions of the investigators. These included the formation of heterosexual-peer relationships, increased "helping" behaviours between patients, greater verbal interaction and a carry-over of interaction from the small groups to other activities. The utility of this approach with dementing patients cannot be guaged but perhaps there is an encouraging indication from this study that non-demented elderly in an institutional setting can adopt a general caring role towards those that are mentally and physically impaired.

Finally the paper by Lewis (1975) is a good illustration of the change in direction of "activity" approaches that has taken place since the earlier studies of Cosin and Pappas in 1958. Lewis describes a programme of activities determined by psychogeriatric patients themselves. Again this group was of mixed functional and organic diagnosis and no empirical data is presented. The patients were formed into one basic group termed a "Socialization Club" which engaged in a variety of fairly structured activities such as communal singing, group discussions, etc. In this group the patients determined, with the therapist's assistance and support, what other activities were appropriate. As a result, small groups or "clubs" were set up for cooking, ecology and gardening, community activities and so on. A strong reality orientation component was also incorporated for all patients. The result according to Lewis was a "self-determined atmosphere which defeated patronization and dependence." Throughout the programme the stimulation of communication and socialization was a clearly defined goal and the patients became more actively involved in being able to share more appropriately some of their thoughts and feelings with others. Many activities incorporated old skills, e.g., table setting, cooking, other encouraged new ones, e.g., poster making, fine handcrafts. This may be broadly described as a "normalization" approach to geriatric care as per the Wolfenberger (1970) model, although the links with the "structured stimulation" approach are obvious. Considerable interest in this sort of approach has come from those who are primarily concerned with the philosophy behind care provision rather than issues of clinical effectiveness and outcome, e.g., local authority social service departments.

The reader is directed to Lodge (1980) and Marston and Gupta (1977) for further discussion of models of care based on the notions of "quality of life" and "resident participation" in the process of care provision. Blunden and Kushlik (1975) have coined the term "engagement" to describe the general aim of having the elderly person "react with materials or with people in a manner which is likely to maintain or develop his skills and abilities". Further discussion of this approach and its potential utilitywith dements will be incorporated later.

II. Studies Concerned with Behaviour Modification

Behaviour modification has had considerable success in other clinical fields such as the management of chronic schizophrenics and the mentally handicapped. The primary focus is on the application of operant conditioning principles and procedures to the modification of patient behaviour (see Krasner, 1971; Leitenberg, 1976). Operant conditioning is essentially the strengthening, maintaining or weakening of a behaviour by the events which contingently follow it.

Lindsley (1964) was one of the first advocates of this procedure with geriatric populations. He described three features of operant conditioning that are important:

(1) precise behavioural description;

(2) functional definition of stimulus, response and reinforcement;

(3) attention to behavioural processes.

Not all work in behaviour modification that will be reported in this section pays equal attention to these three dimensions. This is because behaviour modification can be approached in a number of ways which do not always adhere strictly to the operant conditioning model of behaviour change. All do adhere, however, to the pre-requisite of precise behavioural measurement before and after the introduction of a precisely described set of intervention procedures. Evaluation of these studies is therefore made easier than some of the studies reported in the previous section. Studies relating to the precise description of behaviour-environment relationships in the elderly will be included as will studies primarily directed at the modification of behaviour through alteration of environmental stimulus, reinforcement, or a combination of both. The literature is therefore somewhat more diverse than a first glance might indicate.

Attempts have been made to conceptualize a number of other approaches, already referred to, in behavioural terms. Toepfer et al (1974) interpret the re-motivation approach as behaviour therapy, while Mueller and Atlast (1972) describe a behavioural management approach to resocialization. Woods and Britton (1977) in their review of the literature argue that most of it can be construed in a behavioural framework. In an eclectic sense this is a reasonable interpretation as most psychological therapy for any age group has either implicit or explicit behavioural goals. The studies to be described in this section, however, will all be specifically behavioural in rationale and approach. Not all, however, will be concerned with senile dementia.

As mentioned earlier laboratory studies of operant conditioning in dementia suggest that subjects condition well and are sensitive to alterations in schedules of reinforcement provided attention is paid to providing suitable reinforcers (Ankus & Quarrington, 1972). Applications within the context of treatment of problem behaviours in elderly persons generally support this but as Hodge (1977) cautioned, few studies provide direct evidence of the efficacy of this approach in dementia. Hoyer (1975) in reviewing what he assesses to be a relatively small number of operant studies suggests that the reason for this might lie in the therapeutic nihilism associated with the diagnosis of "chronic brain syndrome" in the U.S.A. The trend towards the usage of Behaviour Oriented Records might stimulate more interest in behaviourally directed intervention procedures. Lindsley (1964) recommended the development of prosthetic or supportive environments for the elderly based on operant principles and argued that operant techniques are useful in determining the extent to which behavioural deficits are either biologically based and irreversible or environmentally based and due to inadequate reinforcers.

Mueller and Atlast (1973) viewed the limited social interactions of residents in a geriatric setting from this second standpoint in that prior social and self-care behaviours were assumed to have undergone extinction. A discussion group was set up and intra-group interaction increased dramatically, contingent on the use of token reinforcement. No control group was employed and the effects of token reinforcement are confounded with the group techniques employed.

Attempts have been made to change a wide variety of other behaviours. Libb and Clement (1969), for example, individually reinforced four geriatric residents of a psychiatric hospital for exercising on a stationary bicycle and three of the four increased their rates of exercising. Baltes and Lascomb (1975) showed that the chronic "screaming" behaviour of an 80 year old nursing home resident could be reduced by shaping and strengthening behaviours incompatible with screaming in conjunction with a modified time-out contingency following each screaming episode.

Baltes and Zerbe (1976) successively developed self-feeding behaviour in two elderly residents of a nursing home who did not show this behaviour and had to be fed by staff. Three behavioural methods were combined - stimulus control, reinforcement and time-out. Stimulus control for one resident involved both a change of eating location from dining room to bedroom to exclude discriminative stimuli associated with non-feeding behaviour and the use of precise instructions to the patient to commence eating. Reinforcement was based on the Premack principle which states that a high frequency behaviour can be used to reinforce a low frequency behaviour. In this case the accompanying beverage, which was always drunk without assistance, was provided only after a spoonful of food had been eaten. Time-out involved the experimenter lifting the beverage and turning her back each time the patient exhibited an undesired behaviour, e.g., eating with fingers. A similar strategy was employed with the second resident but with different stimulus control and social instead of tangible reinforcement. Self-feeding for both increased dramatically.

The Premack principle was also employed by Hoyer (1975) who strengthened exercising and participating in other activities in a 78 year old lady who refused to attend such therapeutic activities. Half of her waking time was spent in excessive, ritualized cleaning of the ward and she spent no time in structured ward activities. Cleaning was made contingent on attending these activities. The number of structured group activities (i.e., reality orientation, re-socialization, exercise class) required, and the time contingency in each, was gradually increased over a five.week period, and her behaviours changed accordingly. Such treatment programmes might raise ethical questions in the reader's mind. These will be discussed in a later section.

Geiger and Johnston (1974) used a positive reinforcement procedure with six geriatric in-patients who were self-feeding but showed extremely low rates of "correct" eating behaviour. The average number of meals eaten correctly increased from 12% to 84% over the duration of the study. MacDonald and Butler (1974) cite reports that a significant percentage of nursing home residents who can walk need help and are frequently encouraged by staff to be wheeled about in wheelchairs. Excessive use of a wheelchair for such cases leads to muscular atrophy over an extended period of time. Using stimulus control (prompts to walk) and reinforcement (conversation and praise contingent on walking) these investigators demonstrated marked and immediate increases in walking behaviour and conclude that it is factors in the physical and interpersonal environment which encourage and foster immobility. This is similar to the "excess deficit" model (Brody, 1971) discussed earlier.

Pollock and Liberman (1974) have applied behaviour therapy to the treatment of incontinence in six demented in-patients. Social and material rewards were made contingent on the patients having dry pants when checked and wet pants were punished. No significant changes were observed in the patients' incontinence and the conclusion is drawn that incontinent behaviour in the elderly is a multifaceted problem with a primary etiology that in the majority of cases is not related to staff attention. This point has been emphasized by Hodge (1977) who criticizes studies such as Pollock and Liberman's for being overly simplistic in their behaviour analyses and not taking sufficient account of the range of neuropsychological impairments that can occur in dementia and which have the potential to interfere with learning based approaches. Potential non-medical factors in the incontinence of dements are visual agnosia; the patient cannot recognize the toilet, short term memory deficit; the patient cannot remember how to get to the toilet, deficits in ADL; the patient cannot undress properly in order to do the toilet, and finally the inability to recognize the sensation of a full bladder. Only when precise difficulties are pinpointed can effective behavioural treatment be introduced. Hodge concludes that given the specific neuro-psychological impairment associated with dementia, behaviour modification, if appropriate, may have to be integrated into a more complex therapeutic package than has hitherto been necessary in other groups of patients. Certainly the evidence cited in most studies is for effectiveness with geriatric but, and it may be a big but, not necessarily demented patients.

Of course if any treatment form has the potential for precise behavioural analysis and treatment, behaviour modification has this potential. Whether it will prove effective is another question. Brody (1971) provides convincing evidence that a variety of specific target symptoms can be attacked. In what is the most detailed single investigation carried out in this area so far, a research group at the Philadelphia Geriatric Centre compared two matched groups of moderately-severely mentally impaired aged subjects. Mental impairment was measured on the Kahn-Goldfarb Mental Status Questionnaire (Kahn et al, 1961) and both groups were extensively evaluated by a multidisciplinary team at the commencement and at successive stages of the project. In both groups an attempt was made to identify "excess disabilities" - the occurrence of functional impairments judged to be in excess of those necessarily occurring as a result of the individual's organic condition. These amounted to fairly specific and molecular behavioural goals but the criteria used to identify them are not described in detail. The experimental group then received one year of intensive treatment from hospital staff aimed at reducing these disabilities. No description is given of what constituted treatment other than that the staff were free to call on all available programmes at the centre and develop new treatments when appropriate. Comprehensive evaluation of physical, mental and behavioural status and also excess disabilities were taken before and after the treatment period. Clear cut findings emerged. At the end of a year's treatment evaluation of the excess disabilities by both staff and outside observers showed a very definite advantage in favour of the experimental group. After a further nine month follow-up this difference had been eroded away. The groups did not differ at any point on a wide range of other variables, 109 in total, and both groups showed a decline in their general health over the year of treatment period. These results suggest strongly that improvement was confined to the "target" behaviours or "excess disabilities" and did not generalize to the 109 variables, which although not identical to the "excess disabilities", according to Brody et al "constituted important areas of functioning for an aged population". Thus the improvements are likely to be due to the specific treatment programme rather than to the increased overall attention to the subjects which is a feature of many of the more general intervention approaches already described. Brody et al point out that if they had relied totally on traditional evaluation methods (i.e., the areas tapped by the 109 variables) they would have concluded that the individualized treatment programme was ineffective. However, by pinpointing and specifying behaviourally the exact condition to be treated and then evaluating the impact of treatment on the specific behaviour, the effectiveness of the treatment programme was demonstrated. Thus though not a strict behaviour therapy approach this paper demonstrates the specificity of behaviour and behaviour change in the demented elderly. This can be seen as both an optimistic and pessimistic indication. Optimism should result from the clear demonstration that behaviour change is possible while pessimism might result from a realization that considerable multi-disciplinary efforts were required over an extended time period to produce isolated change that did not appear to generalize. As a foot-note it was this study which identified "aggressive attitude" as a prognostic variable in treatment outcome (Kleban et al, 1971).

Ward-wide token programmes have been reported with the institution-alized elderly (Mishara, 1971; Filer & O'Connell, 1964). Improvements have been noted when rewards in the form of money and tokens were made contingent on the performance of certain specific behaviours, e.g., ward work, personal hygiene and self-care. The use of this "mileu" approach has not been tested with a specifically demented patient group but Lindsley (1963) prescribes some interesting and provocative ideas on how the "mileu" should be designed for the elderly in general. This involves the careful redesign of the institutional environment to be more compatible with the elderly person's functional capabilities. In particular Lindsley advocates the creation of "prosthetic environments" which can reduce behavioural debilitation by compensating for or supporting the specific behavioural deficits of each aged person. This is in contrast to, but not incompatible with, the "therapeutic environment" approach which attempts to alter the deficits themselves, e.g., Brody's work on "excess deficits". Prosthetic environments are characterized by working continuously. They are described by Lindsley in behavioural analytical terms as providing (1) discriminative stimuli; (2) response devices, (3) reinforcers, and (4) reinforcement schedules. Examples of discriminative stimuli are simple and dramatic patterns, long durations and higher intensities of stimulation designed to amplify stimulation and facilitate behaviour. These can be used,for example, in Braille or "talking books". Multiple sense displays are advocated where the person is under the high control of a small portion of his environment or has a generally weakened attention. Expanded visual and auditory narrative stimuli might also find useful application as might response-controlled discriminative stimulation in the presentation of films, e.g., a film stops when the patient stops paying attention and restarts when attention is restored. Response devices suggested include devices characterized by (a) response force amplification, e.g., throat microphones to amplify feeble voice tone; (b) wide response topography, e.g., large push buttons as opposed to dials on devices operated by palsied individuals. Lindsley advocates the use of individualized visual and auditory reinforcers that are characterized by (a) being historically relevant, e.g., an old song, food or picture and (b) being "expanded", e.g., music, movies and videotapes expanded in the auditory and visual dimensions, may be more reinforcing to the elderly. To generate high rates of behaviour Lindsley advocates regular as opposed to intermittent reinforcement utilizing immediate personal reinforcers such as exciting foods, beautiful clothing and so on. Viewing Lindsley's suggestions with a practical eye, it is difficult to see how just such a prosthetic environment could be operated effectively. However the paper is a landmark in its emphasis on environmental features as potential prostheses for behavioural deficits.

Before leaving this section on behavioural approaches a group of studies should be described which are characterized by being concerned, like many of the studies in the first section, with general features of social behaviour and participation, as opposed to many of the studies described thus far in this section which focus on more discrete behavioural deficits such as incontinence, self-care activities, etc. This general approach therefore places less emphasis on direct work with individuals and instead looks at the general behavioural effects of environmental manipulators. They are examples of what Lindsley (1963) would describe as the "prosthetic" as opposed to "therapeutic" approach, which although behavioural in methodology, bears as much resemblence to the studies in the first section than many so far described in this section on behaviour modification. However, although "general" aspects of behaviour are the focus these are operationally defined and measured, the simple interventions are explicitly described and the overall rationale is thus perhaps a closer approximation of the behavioural method than of the "general activity" method of intervention.

Quilitch (1974) measured the frequency of clearly defined purposeful daily activity in a ward of 43 regressed geriatric patients. During a series of behaviour ratings taken every ten minutes in a 1½ hour period for fifteen days, a daily average of only three patients were found to be purposely engaged. During a regime of programmed activities in the form of bingo games for one hour each afternoon, the daily average of patients engaged in purposeful acitivity rose to thirteen but dropped to three again when the daily activities were discontinued. On the activity days residents were prompted but not coberced into joining in. Towards the end of the activity period prompting was withdrawn. As well as prompts, reinforcers in the form of prizes for winners and refreshments available to all participants after the games were included and it is not possible to separate out the relative effects of the activity itself, the reinforcers provided nor the effect of staff prompting in determining the increase of purposive behaviour.

McClannaghan and Risley (1975) provide some evidence for the effective role of staff prompting. In a nursing home situation they attempted to increase participation in recreation activities. The definition of participation was broad enough to include almost any form of appropriate behaviour including engagement with equipment, materials or other persons. Inappropriate responses such as stereotyped behaviour, tantrums and smoking were excluded. During baseline an average of 87% of the residents were not engaged in social interaction and only about 35% were engaged in appropriate activities at any time. The data showed little variation from hour to hour or day to day. During the intervention period a recreation area was set up in the lounge equipped with games, puzzles, etc., on visible display. Residents could select any of these items and take them to a nearby work table or lounge chair. Using a similar highly reliable rating system to that employed during baseline, participation was recorded on 35 alternative "equipment given" and "equipment not available" days. On "equipment given" days residents entering the lounge who did not request or select recreation equipment were sought out by the activity leader who placed recreation equipment in his hands and prompted him to participate. Prompting consisted of inviting the resident to use the equipment, demonstrating how to use it, and if necessary, assisting him in using it appropriately. Additional prompting was provided only when residents stopped using equipment or indicated that they wanted something else to do. The number of residents in the lounge and the number participating was recorded on each day. During a second phase of 35 days the manipulative area was open every day with an identical "equipment given" procedure alternating with an "equipment available" procedure. In the "equipment available" procedure residents were required to either approach the shelves and make their own selection or approach the activity leader and make a request, i.e., this was a "no prompting" procedure.

The results are shown in Figure 3*. Level of attendance did not differ greatly between conditions but there were marked differences in participation. Residents participating averaged 74% during the "equipment given" condition but fell to 20% during the "equipment not available" condition. Thus placing materials in residents hands and prompting them to use them more than tripled the mean per cent of residents in the lounge area who were engaged with their environment. During the second phase, the mean per cent of residents participating during "equipment given" sessions remained stable, the grand mean for these days was again 74%. In the "equipment available" condition, however, when residents were not prompted to participate, the grand mean per cent of residents participating was 25%, only slightly higher than the mean of the "equipment not available" condition in the first place.

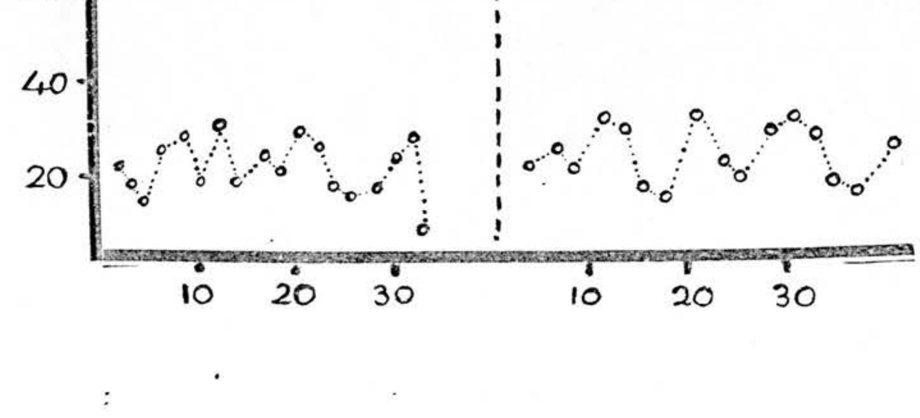


Figure 3*: Mean per cent of residents participating in the lounge. (From McClannaghan & Risley, 1975).

This study demonstrated that prompting can effectively maintain residents' participation with manipulative materials and that merely making equipment available and waiting for residents to take the initiative in requesting, selecting and using it results in low levels of participation. McClannaghan and Risley conclude that much of the pervasive inactivity of the debilitated aged may well be a function of only a slight increase in the threshold of stimulation necessary to induce activity.

Blackman et al (1976) conducted a study into social participation in a home for the elderly, where two-thirds of the residents were described as "confused and disorientated". Over half the residents needed complete assistance with grooming and dressing and only six required no assistance. A single group reversal design similar to that employed by McClannaghan and Risley (1975) was employed with alternating intervention and non-intervention conditions. The intervention condition consisted of the introduction of a special activity (coffee and juice available before breakfast in the solarium) added to the normal routine on three days per week, Monday, Wednesday and Friday. The floor space of the home was divided into three observation areas and behaviour was recorded in each area by a moving observer using a six minute time-sampling procedure, the modified PLA-CHECK (Dake & Risley, 1972). Behaviour categories employed included various operationally defined examples of pro-social, non-social and antisocial behaviour. Residents were informed of the new activity two days prior to commencement at a regularly scheduled residents' meeting. Staff were instructed to remind the residents on getting them up on activity days that coffee and juice were available in the solarium. Each resident was reminded once only and no pressure was put on the residents to participate. Residents who could not find the solarium or who could not get there independently were helped by staff.

An attendant brought a cart on which the coffee and juice were clearly visible to the solarium just prior to the activity starting. This cart by intention had noisy castors. Residents entering the solarium were offered coffee or juice and refills were offered at a later time. Following five days of basline, thirty days of alternating "activity" and "no-activity" days, the activity was terminated for eight days (reversal) and then reinstated for twenty days.

Results indicated that presence of residents in the solarium was contingent on the activity being available and that this change in the residents' early morning demography was accompanied by systematic increases in pro-social interaction between residents with no change in interaction between residents and staff. Residents remaining in the lounge showed no decreases in social interaction indicating that the increase in social interaction in the solarium could not be accounted for by the movement of "verbal" people from one area to another. The situation in the solarium naturally encouraged social interaction by being a small area where the natural spatial arrangements were more conducive to interaction and where a historical stimulus situation (Lindsley, 1963), the "coffee morning", was present.

The results for this increased social interaction are not as clear as McClannaghan and Risley's data on participation. It is not clear whether receiving refreshments, the occurrence of a social situation, some combination of the two or staff attention maintained the behaviours related to going to the solarium. It is also not clear which of the possible cues (staff prompts, the attendant rolling the refreshments to the solarium, other residents going to the solarium, etc.) were most relevant. Likewise it is not clear which events stimulated and maintained social interaction. Nevertheless somewhere in the fabric of this activity existed appropriate stimuli and reinforcement to re-establish behaviours, which were once, but were not currently present in the repertoires of the residents.

In a similar fashion, Powell et al (1979) investigated the effect of a new recreational activity, namely gardening, on the generally low level of engagement of residents in two lounges of a Local Authority home for the elderly. Gardening sessions were held on one afternoon per week in the dining room of the home. Precise directions for the organisation of this activity were employed. The residents' level of engagement was evaluated during the weekly gardening sessions and on another afternoon each week when there were no planned recreational activities. The results showed that indoor gardening was very successful in producing sustained activity by the residents attending and that engagement of the residents was significantly higher on gardening than on non-gardening days. Of thirty-six residents, however, only an average of six attended each gardening session. Thus the increase in engagement for the total resident group on gardening days was only marginally higher. Low attendance, it may be speculated from the work of McClànnaghan and Risley (1975) and Blackman et al (1976), was probably due to either the absence of "prompts" to participate, brief announcements only were made in the lounges, or to the absence of a strong reinforcing effect in the activity itself.

Quattrochi-Tubin and Jason (1980) coin the term "stimulus control procedure" to describe the introduction of a stimulus designed to encourage behavioural change. The announcement in a nursing home that coffee and biscuits were available in the lounge increased lounge attendance and resident interactions and decreased television watching. Moreover, attendance and participation during a subsequent activity session, held immediately after the coffee period, increased. Attendance, interactions and participation decreased during a return to baseline period, and increased again with re-implementation of treatment.

The work on behaviour modification cannot be easily summarized spanning as it does both work with individuals and groups, the tackling of specific vs. general behaviour deficits through varying emphasis on explicit remediation and environmental prostheses. In particular the use of "mixed" populations of elderly in care make it extremely difficult to evaluate the particular value of these approaches with dementia. As we shall see in the next section the behavioural approach has had some influence on the development of the reality orientation approach.

III. Studies Concerned with Reality Orientation

As pointed out by Miller (1977) Reality Orientation (RO) may well be the first psychological technique specifically designed for use with the mentally deteriorating elderly. It developed in the Veteran's Administration Hospital service in America and the first published descriptions appeared in the late sixties (Folsom, 1967, 1968; Taulbee & Folsom, 1966). A description was also published by the American Psychiatric Association (1969).

Unlike the development of behaviour modification approaches with the elderly, RO had no apparent historical precedent other than an implicit sympathy with the "activity" theory of ageing as proposed by Havighurt et al, (1968). Thus, whereas the strategies of behaviour modification with the elderly draw heavily on previous work with other groups and the operant tradition in behavioural treatments, RO developed from no explicit rationale other than a need to develop innovative care procedures in VA Hospitals that were practical and utilized existing resources.

It is important to understand this point if one wants to make sense of (a) the lag that is evident between the development of the first RO programmes in the late 1950's and the first published descriptions referred to above, and (b) the lag between these very general descriptions and more explicit accounts of what constitutes RO. The tradition, if you like, was one of "practice rather than publish" and even today the emphasis in the United States is still on training hospital and home personnel in a very basic package of procedures rather than on the refinement, evaluation and systematic improvement of these procedures. This latter strategy has only received attention since RO came to Britain.

Accounts of RO procedure have become gradually more explicit over the years. The two key premises that underpin all of RO have remained unchanged however. These are that (1) confusion, irrespective of cause is remediable, and (2) the key 'therapists' in working with the institutionalized elderly are the nursing staff and nursing assistants who have the most frequent contact with the patients. Thus RO is defined as an "aide-centred" programme. In Folsom's (1968) description of RO the care provided by these primary staff was encapsulated simply in a set of 15 guidelines (Table 10).

These basic ideas, untested empirically, found acceptance in practice, primarily through the establishment in the VA system of a full-time RO training programme at Tuscaloosa, Alabama. This provided training within and without the VA system to some 20,000 persons from 33 American states and Canada between 1969-1979 (Scarbrough, 1979). The perceived need for such a basic programme is apparent in the comment received from one of the staff quoted verbatim below:

> "I would like for us not to have to call RO a technique. I would like it to be so natural and ordinary that everybody would do it just as easy as breathing but since they don't, we have to putt it apart, make it something separate, call it a technique and teach it to people who should already know it, so it will be done." (Linda Drummond, RO training programme, Tuscaloosa, Alabama).

Table 10

Reality Orientation Guidelines
(Folsom, 1968)

1. Provide a calm environment.

2. Establish and maintain a set routine.

3. Give clear, simple responses to residents' questions.

   Ask clear, simple questions of residents.

4. Speak distinctly and directly to residents.

5. Remind residents of time, place, and person.

6. Correct residents when they ramble confusedly in speech and actions.

7. Explain each new procedure before asking a resident to do it.

8. Give residents plenty of time to respond.

9. Direct residents around by giving clear directions; if need be, guide them by accompanying them.

10. Show residents you expect them to understand and to comply.

11. Show residents you expect them to care for themselves as much as they are truly able.

12. Treat residents as respected, dignified adults.

13. Show your interest and sincerity to residents.

14. Show kindness and politeness, while being matter-of-fact.

15. Do all the above consistently.

This process led to a much more explicit account of RO being published in 1978, incidentally the year the present writer's work commenced (Drummond, Kirchoff & Scarbrough, 1978). Here RO is defined as "a basic technique used in the rehabilitation of persons having memory loss, confusion and time-place-person disorientation." It has two components: "Twenty-four Hour RO provides a means of structuring the environment throughout the 24 hours so that the staff can intervene appropriately and in a consistent way with each confused person. The interaction would be either to prevent confusion or to assist a confused person regain an awareness of his own identify and the concrete existing realities in the surrounding environment. Classroom Reality Orientation is a supplement to 24-Hour RO in a more structured and intensive small group setting. It is a concentrated group activity particularly useful for those who have time-place-person disorientation. Classroom RO provides these individuals, who may also have a short attention span, with extra stimulation through structured sessions."

RO is very much a technique relying on a 'package' of related procedures. These have been described in detail in a manual produced by the American Hospitals Association (1975). Drummond et al (1979) provide a detailed account of classroom procedures in a manual geared to training class leaders in the set of skills required.

For the purposes of the present discussion only a brief description of the RO 'package' will be presented.

(i) Twenty-four Hour RO. The key emphasis is on teaching care staff to interact with the confused person in such a way that (a) relevant orientation-related information is presented to the person at each interaction in such a way that the person comprehends, i.e., the communication should be slow, clear and simple. Not too much information should be presented at any one time, e.g., "It's twelve o'clock Mrs. Jones and almost time for lunch in the dining room" or "Goodness Mrs. Jones, the winter is really here, it's only four o'clock and it's dark outside."

(b) The person behaves as independently as possible, i.e., as most contact between staff and patient occurs in a context when something is happening such as the patient getting up, receiving medication or going for a meal, the communication should orientate the person towards that activity by providing an orientating 'prompt', allowing time for the person to respond and reinforcing that response when it occurs, e.g., "Good morning, Mrs. Jones, this is Mrs. Armstrong, the nurse on duty. It's eight o'clock in the morning, Mrs. Jones, so please get up and look out clothes from your wardrobe." As well as being calm and clear in communicating the nurse should also be prepared to repeat herself if necessary and should phrase the communication in a way that implies the patient will respond.

(c) Confused or disorientated behaviour or speech is corrected, i.e., if the patient approaches staff in a way suggesting that the staff member has been mistaken for a relative, or if the patient indicates an inappropriate activity such as 'hopping round and seeing how Betty next door is keeping' the staff member does not 'go along with' this but rather attempts to correct this confusion by communicating details of the actual situation such as "Mrs. Jones, this is Greenlea Old Peoples Home. You moved here from Balcarres Street two weeks ago. Your old neighbour Betty doesn't live here but she rang yesterday to say she will be coming up to visit next week." Throughout RO the emphasis is on repetition and consistency. The former is handled by having staff aware that the patient may not remember something but may need to be constantly reminded. The latter is handled by good staff-staff communication. For example, the staff member who received the message from Mrs. Jones' ex-neighbour would be required to make a note of this on file and inform other staff at shift change.

Coupled at all times with these interpersonal features of information provision, behavioural expectancy and correction of confusion the staff should also attempt to convey what they say in a manner that is at all times respectful of the patient, i.e., although the communication is simple it need not be patronizing, although firm at times it need not be angry. The fourth feature of 24 hour RO involves modification of the physical as opposed to interpersonal environment. This is re-arranged to provide many clues about person, place and time. These clues may be tangible orientation aids or 'props' such as signs, clocks, calendars, information boards or directional arrows, located in conspicuous places in the environment and designed to compensate for visual impairments or they may be items of a more personal nature for the individual patient such as pictures of loved ones, a treasured ornament, a handmade quilt - things that help reinforce reality for the individual.

Although 24 hour RO emphasizes the present, talking about the past is not discouraged. Indeed staff are encouraged to compile information about a patient's past and use it appropriately in communicating to the patient. This involves possibly reminiscing with a patient about his past but making clear at the same time that it is the past and not the present that is being talked about. This might be done by simply contrasting the past with the present, e.g., staff to patient in decorating a ward for Christmas: "So you used to get a real Christmas tree from the grocer's shop on the corner when you lived in Balcarres Street, Mrs. Jones. I'm afraid we always use an artificial tree here at Greenlea. I must agree with you a real tree is more Christmasy." This brings out a point that is at least implicit in RO - the need to maintain a patient's own personal sense of identity. To do this it may well be necessary to provide the patient with the opportunity for meaningful activity such as the chance to keep up with an old hobby or special interest or the chance to write to relatives, etc.

In this way RO proceeds round the clock and from day to day. All contact that the patient has with his environment, i.e., the physical space he lives in and the people who provide for his care, is structured as much as possible to be orientating contact. The emphasis is on having the patient understand and make sense of what is going on round about and respond appropriately.

(ii) Classroom RO. This is an additional procedure designed to provide more structured assistance with reorientation. The classroom sessions are designed to enhance learning by providing an intense exposure to orientation information for small groups of patients in a setting which although semi-formal and 'educational' encourages dialogue and social interaction to occur. Classes of four to six patients meet about five days per week for about 30 minutes each day. The purpose of each class session is to reinforce the class members' orientation to person, place and time. This is the responsibility of the class leader who has a set of established procedures as a guide and a number of orientation aids such as an RO board, calendar, clock, et., as useful equipment.

The main features of Class RO are:

(a) Name learning - patients are always addressed by name and encouraged to call each other by name.

(b) Review of basic information - information relating to place and time such as the name of the hospital or home, its geographical location, the day, month and year, the weather and the next meal, is obtained by a structured discussion with the patients and the information placed on the RO board. If a patient is unable to provide a piece of information other patients are encouraged to help, the question may be rephrased in a simpler fashion or a clue given and if no response is then forthcoming the leader provides the answer and has the patients repeat it. Appropriate responses are rewarded verbally ("good", "that's right") and non-verbally through a smile or a touch. When a patient makes an incorrect response his effort is recognised and further clues provided. Efforts are made to prevent the patient becoming frustrated when he can't remember a simple fact - questions are selected that the patient can respond appropriately to, even if this only involves a nod or a "yes", e.g., "did you hear Mr. Smith say that the weather is hot and sunny?".

(c) Easy familiar activities are provided which lend themselves to simple, friendly conversation, e.g., identifying familiar objects, recognizing and discussing pictures, reading the menu for the next day. More complex activities are included as patients improve although abstract materials and discussions are avoided. Items of personal interest may be discussed - the patient's home town, former occupation, or family, etc.

(d) A continuum from 'basic' - 'advanced' procedure identifies all RO classes. The leader structures class activities to suit the level of patients in the class. This is done by providing various levels of leader guidance, varying demands on patients, more or less extended discussions and activities of varying complexity.

Classes are not homogeneous but should include patients of fairly similar degree of intellectual impairment. Drummond et al (1978) stress the emphasis of basic class RO to be different from advanced class RO. As patients improve they graduate from a basic to an advanced class.

In summary, Reality Orientation as a treatment technique can be characterized as a way of reorganizing the social structure of the institutional environment so that residents are encouraged and allowed to behave in a more orientated fashion. The key to the successful implementation of such an approach is in training staff members to be more aware of individual resident behaviour and to use their own behaviour patterns to reinforce desired behaviour on the part of the resident. By providing residents with repeated cues about spatio-temporal events in their environment, the staff is arranging the milieu so that residents become aware of this basic information which is so essential to daily functioning. Reality Orientation provides staff with structured behavioural patterns for interaction with residents.

Efforts at evaluating the RO approach were characterized in early studies by being retrospective or confined to the impressions of those conducting the procedures. Folsom (1968) reported that only 4 of 52 patients completing a year's RO regressed, with a further two completely unable to co-operate. Seventeen completed 'basic' and 'advanced' RO courses, five being completely discharged (Taulbee & Folsom, 1966).

Letcher et al (1974) report the results for 125 men who participated in RO at the Veterans Hospital, Tuscaloosa, Alabama between 1965-1970. No control group was utilized and the effects of other aspects of treatment other than RO were not controlled for. A four-level grading system was employed to measure (a) the degree to which patients could care for themselves, and (b) summarize their nursing care needs. Some 80% were diagnosed as "organic brain syndrome due to cerebral arteriosclerosis", 15% had had cerebro vascular accidents and 6% had unspecified organic brain damage. Before patients in this sample began RO 91% were on the more dependent nursing levels 3 and 4. When the study ended, the proportion on levels 3 and 4 had dropped to 73%. The proportion of patients on levels 1 and 2 rose from 9% before participation to 26% after participation. Overall, 32% of the patients improved while 68% remained the same. Of the 39 patients who showed improvement, 23 improved one level and 16 improved two or more levels, including 6 patients on level 4 who progressed to level 1! The authors state that the patients' physical conditions, both in terms of brain syndrome diagnosis and other medical problems, were unrelated to the likelihood of improvement. However, while some patients were noted to improve with only a brief period of participation, the rate of improvement was apparently much higher for those who stayed 18 months or more. The rather surprising result was reported of 30% of patients involved for less than eighteen months being improved, compared to 70% improved of those who were involved for more than eighteen months. The methodological problems inherent in this study and the rather dramatic results obtained reduce it to one that is not worthy of serious consideration. It is difficult to imagine that even the most optimistic authority would expect a demented group to show any improvement on such a crude measurement instrument, nevermind the reported extent of this improvement, and the assertion basically that this gets greater the longer the dementia and the treatment proceeds. Studies such as the above do nothing to ease the concern that the diagnostic classification used in U.S. settings shows variability at least and perhaps is quite uncomparable to that used in this country (Duckworth & Ross, 1975; Copeland et al, 1975).

Fortunately, since 1974 at least one controlled study of RO has appeared each year, perhaps making RO the most empirically evaluated approach to the behavioural management of the demented patient. Barnes (1974) evaluated the effect of class RO, separate from other rehabilitation procedures, with six seriously demented patients. After six weeks of half hour classes six days per week, he found no significant improvement on a questionnaire designed to measure orientation. However the patients were rated as qualitatively improved by the nursing staff and after classes were withdrawn a significant deterioration in orientation was demonstrated indicating perhaps that the classes were acting to prevent deterioration from occurring. Barnes speculated that measurable behavioural change might have been achieved if longer term application of class RO had been attempted or if staff had been involved in providing a 24 hour RO programme geared to encouraging greater self-sufficiency and independence in the patients.

Support for the first suggestion is provided by Brook et al (1975) who found marked improvement in nine demented patients attending daily class RO over a 16 week period. These patients were introduced to a specially equipped RO room where therapists actively engaged them in various tasks such as describing objects, writing diaries, etc. The control group (n = 9) had a similar amount of exposure to the experimental situation but the therapists remained passive and any activity had to be self-initiated. Blind ratings of intellectual and social functioning were made by nursing staff who did not know to which group patients belonged. Ratings improved initially in both groups but further gains after about two to four weeks were confined to the experimental group whilst the control group started to fall back. These results imply that sustained effects cannot be achieved by merely exposing patients to a different and more stimulating environment. The patients' active participation under direction of staff was necessary to obtain further improvements after the initial placebo or "stimulation" effect of being removed from the ward environment had begun to wear off. Furthermore the results indicated that the amount of improvement depended on the degree of dementia with the mildly dementing patients benefitting most and the severely dementing patients benefitting least. Unfortunately here the groups compared numbered only three patients each.

Although this study can be criticized for the small total number of dementing patients involved and the lack of information on the measurement instrument used, it does provide good evidence for the effectiveness of the RO procedures involved, in particular the structuring of the interpersonal staff to patient environment in class RO. It should be remembered that change was resultant from an intervention that lasted only half an hour per day.

Harris and Ivory (1976) evaluated a combination of both 24 hour RO and class RO with long-stay geriatric patients in the Florida State Mental Hospital. Although the average age of patients was only 66 for the experimental group (n = 29) and 71 for the control group of the same size, the average duration of hospitalization was about 24 years for both groups. It is not surprising that the diagnoses were considerably mixed ranging from various forms of mental deficiency and psychosis to organic brain syndromes. In fairness to this study it must be pointed out that RO is not a technique with sole application to dementia although it is specifically relevant to this condition. Indeed RO is defined in much of the early literature as a technique designed to prevent, reverse or halt confusion and disorientation brought about by any condition. However in the context of the present review we are once again faced with an American study where the diagnostic mix prevents critical evaluation of the worth of an approach for the dementing group alone.

The Harris and Ivory study is noteworthy in that it is one of only two which have evaluated the main component of RO, namely 24 hour RO, albeit in combination with class RO. This study also employed a good-sized sample of patients and utilized a fairly detailed assessment procedure of ward behaviour, verbal orientation behaviour and aide-therapists' observations and impressions. The orientation questionnaire (The Florida State Hospital Patient Behaviour Rating) was particularly interesting in that it included 'quality points' to rate responses to each orientation item. Pre and post measures were taken for a five month RO programme. Although, due to certain methodological difficulties the ward behaviour ratings failed to yield meaningful data, except for bathing and face-washing, the results for orientation revealed that on six of nine verbal orientation behaviours the RO patients were significantly improved when compared to the control patients who received only traditional hospital care. Improvement was found for (1) spontaneous verbal interaction with nurse raters; (2) correct verbalization of nurse rater's name; (3) correct verbalization of own name; (4) correct verbalization of the name of another patient; (5) compliance with a simple request, and (6) correct verbalization of information pertaining to time. Likewise, after treatment, the raters of RO patients saw their patients as being significantly more orientated and engaging in significantly less bizarre verbalizations than did the raters of control patients.

The problems with the ward behaviour ratings employed obtained from the fact that the ratings were made directly and were not unobtrusive. No standardized framework was devised to cope with obvious variability in the demand pressure and time-to-task standards for each behaviour. As noted earlier, 24 hour RO involves orientating patients to tasks and in the Harris and Ivory study the rating of this proved problematic. Staff on the control and experimental wards had different expectations of patient capabilities and the distinction between cause and effect could not be operationally distinguished in the rating procedure employed. This is a very important point: behaviour rating scales in normal use do not often employ direct observational procedures such as this but rather attempt to guage the typical frequency or severity of particular behaviour categories (e.g., Gilleard & Pattie, 1977; Plutchik et al, 1970). Such scales are notoriously insensitive to change. Direct observational methods have only been employed in situations where unobtrusiveness was possible and where the behaviours involved could be clearly defined, e.g., in the rating of social interaction and participation in activities (Blackman et al, 1976; McClannaghan & Risley, 1975). As RO procedure attempts to facilitate independent behaviour through utilization of staff prompts and encouragement, i.e., demand pressure, the effectiveness of this strategy is best measured directly through observation ratings. The results of Harris and Ivory illustrate the difficulty in doing this, and is the only example in the literature of such an attempt being made. The lack of data indicating a behavioural effect for RO will become apparent as this review proceeds. Although there are many possible reasons for this, one of the prime hypotheses must be that the behaviour rating scales employed are just not sensitive enough to detect the sort of changes expected. The major change, if there is a change in behaviour, is likely to be in the patient's 'effectance', his ability to complete one or more parts of a task under specific conditions of prompting, encouragement and assistance.

Harris and Ivory point to the potential factor of 'attention' which is non-specific to RO and which may have affected both staff and patients. Staff constantly received visits from high level officials, administrators, etc. and the resultant pride in their work may have been reflected in both different expectations of patients and different impressions of patients. Likewise patients in RO received a considerable amount of attention from staff which, aside from a specific RO effect, may have influenced their functional ability. Woods (1979), in a study to be reviewed later, deals with this specific point, but it should be noted here than an explicit goal of RO is to foster staff morale and positive staff attitudes. Similarly RO emphasizes the general aim of improving patients' feelings of 'identity and self-worth'. It does not therefore make a great deal of sense to think in terms of some factors being specific and others non-specific to RO. Although it would be of use to know the relative effectiveness of different components in a 'package' such as RO we should not be expecting to isolate components and apply them separately. In this respect Lindsley (1975) has commented that in behaviour therapy the most important goal must be to find effective, implementable 'packages' of behaviour procedures.

Citrin and Dixon (1977) evaluated a combination of 24 hour and class RO with a sample of 25 confused and disorientated residents in a geriatric institution. Residents with severe physical disabilities were excluded from the trial which involved an experimental and a control group situated on separate floors of the hospital. The Reality Orientation Information Sheet (ROTP, 1973) measuring orientation and the Geriatric Rating Scale (GRS) (Plutchik et al, 1970) were used to assess residents before and after the seven week programme. Unfortunately, it seems, staff instruction in RO procedure was limited to one two-hour workshop as opposed to some eight hours training provided in the experiment by Harris and Ivory (1976).

Results indicated no significant between group differences prior to implementation of the RO programme. The control group showed a non-significant decrease in orientation as measured by the ROIS on post-test. The experimental group had a significant increase in orientation and there was a significant post-treatment difference between the experimental and control groups on the ROIS. The results on the GRS were inconclusive. Pre-test to post-test comparisons were non-significant, while post-test comparison between experimental and control group was significant, but perhaps related to the differences, although non-significant, found at pre-testing. Citrin and Dixon conclude that it is questionable whether RO had any effect on the behavioural functions of the residents involved. They also comment that the items on the ROIS, which show change, are in many cases identical to questions asked in the RO classes and in the 24 hour RO environment. This raises the question of whether the effects of RO on verbal orientation generalize to a wider range of less frequently rehearsed responses.

Holden et al (1978) worked with patients in a geriatric unit who were both physically and mentally impaired. She employed class RO six times weekly for twelve weeks and evaluated patient progress on the on the Stockton Geriatric Rating Scale (SGRS), (Meer & Baker, 1966), and the Clifton Assessment Schedule (CAS), (Pattie & Gilleard, 1975 & 1976). Discharge rates for the experimental (n = 15) and control (n = 15) groups were also compared. No systematic change in behaviour as measured by the SGRS was obtained. Only minimal change was noted on the CAS, although initial score on this instrument was of prognostic value in predicting 9 of the 10 patients eventually discharged. Discharge rate seemed to favour the RO patients but the difficulties with this outcome measure have already been discussed and especially in the study by Holden, discharge could have been accounted for by other programme components available at the Leeds Hospital. However, Holden notes, as do several other commentators that RO had a beneficial effect on staff attitude and morale.

Woods (1979) tested the hypothesis that the way attention is given to patients in RO is the crucial determinant of outcome. He draws the analogy between RO and behaviour modification where attention is thought to be effective only when it is given specifically following appropriate behaviour. Working with memory impaired residents of a home for the elderly mentally infirm Woods randomly allocated subjects into three groups of six. Over a five month period one group received class RO five days per week, the second received non-contingent attention in a discussion group, where any contribution was accepted, and the third acted as a control group. RO residents were found to change significantly more than controls on tests of information, orientation and various aspects of memory and learning. However no improvement was found on a behaviour rating scale with all groups showing some deterioration in behaviour over the five month period. The RO group also did consistently better than the 'discussion' group, which received the same amount of staff attention but of a different form, even though staff seemed to be more enthusiastic about this 'discussion' procedure than they were about RO.

These results therefore provide support for those of Brook et al (1975), who found improvements as a result of class RO and demonstrated that it was the factor of staff to patient interaction that was the effective agent. Woods's study also joins those of Harris and Ivory (1976), Citrin and Dixon (1977), and Holden et al (1978), in demonstrating no change in behaviour following class RO. As Woods points out, possibly the variability of his small groups obscured changes taking place, or the rating scale was not a sensitive enough measure of behaviour. Two points are relevant here. The first is the issue raised earlier of the need to develop more refined observational methods of rating behaviour change. The second is our expectation of RO and the relationship between cognitive and behavioural variables. Should we expect class RO which is essentially a cognitive procedure to produce concomitant behaviour change? Two mechanisms for this may be possible: (1) the improved concentration and cognitive capacity resulting from class RO is enough to produce such change, and (2) class RO helps patients to be more aware of the social forces that normally constrain behaviour within acceptable limits. Is such cognitive retraining enough though? Perhaps as Woods suggests actual training in the behaviours of feeding, dressing, toiletting, etc., is required. This is indeed what happens routinely in 24 hour RO but not of course class RO. Perhaps this is why Drummond et al (1978) and others suggest that class RO should be used only as a supplement to the 24 hour procedure?

The appearance of controlled trials of RO procedures in recent years is laudable and has produced both evidence for RO's effectiveness and more critical thinking about the technique itself. It is not surprising that most attention has been focussed on the more easily introduced and controlled classroom procedure. Indeed only two studies have looked at the main 24 hour procedure albeit coupled with a classroom component (Harris & Ivory, 1976; Citrin & Dixon, 1977). The facilitation of cognitive change alone may well be sufficient justification for the use of class RO but if demonstration of a behavioural effect is desired attention must move to 24 hour RO which has greater face validity when such behaviour as opposed to cognitive change is the consideration. No study has yet separated class from 24 hour RO or proven even that 24 hour RO was actually implemented! The production of change in staff to patient behaviour is crucial here and from studies in other areas it is notoriously difficult to achieve. We have no way of knowing from the Harris and Citrin studies whether such change was forthcoming in an RO programme.

Greene et al (1979) extracted the 'information provision' component out of RO and demonstrated in three single case studies that improved orientation could be achieved by means of a simple information provision procedure alone. This involved asking patients questions and providing answers in a one to one interview situation that did not involve the other physical and social activities normally present in RO. The improvement was not attributable to general stimulation effects as orientation returned to baseline levels when answers were not provided to questions. Although the behavioural data is equivocal, with only two data points in each phase of treatment, Greene et al demonstrate some degree of generalization to information items not taught in the orientation interviews.

This study, therefore, provides tentative support for the premise, already mentioned, that behaviour change may follow from cognitive change.

Moreover, Greene et al postulate that such effects may follow a gradient of generalization based on the degree to which a particular piece of behaviour is dependent on orientation. Although the results are interesting this study can be critized for conceptualizing RO as nothing more than information provision. Greene et al in fact call their procedure RO which is akin to teaching an anxious client a simple breathing exercise and calling it relaxation training! This could be a dangerous oversimplification from an ethical standpoint as criticism has already been levelled at RO as an 'indoctrination' procedure (Gubrium & Ksander, 1975). However, in fairness to Greene's study the orientation items were all carefully selected as relevantt to the community life of the day hospital dementing patients he treated. Moreover the patients certainly 'got the pill' in a more systematic way than in a class RO setting where with 4-6 patients and a less specific agenda it is not always clear 'who gets what'. This problem has already been mentioned as particularly relevant to implementation and evaluation of 24 hour RO procedures.

All the studies reviewed so far have focussed primarily on the effects of RO on the recipients of this technique. What are the effects on those who provide it? Some studies have indicated the impression that staff morale and attitude was enhanced (Harris & Ivory, 1976; Holden et al, 1978). We have seen that such a benefit was an explicit goal of those who developed RO (Folsom, 1968; Drummond et al, 1978). A study by Smith and Barker (1972) evaluated the influence of an RO training programme on the attitudes of those who took part. Using the Oberleder Attitude Scale, a measure of attitude towards the elderly, data indicated that the training programme was effective in producing highly significant change in the desired direction. This was maintained at five month follow-up. A control group of university graduate students showed no change. No significant age effect was demonstrated, although younger subjects (aged 20-29) scored further in the desired direction at all three points of testing. No study has looked at the effects of RO on staff morale or evaluated RO from the perspective of normal old people who may, in many situations, such as in old people's homes, have to live in close proximity to an RO programme and the dementing residents who receive it.

The indications that RO has positive effects on staff who apply it are obviously an important consideration because irrespective of the effectiveness of such a technique its application will depend heavily on its credibility in the minds of those who have to carry it out.

Summary

A long line of studies dating from the early 1950s have been reviewed. Many demonstrate that demented patients can respond beneficially to manipulations of the psychosocial and physical environment. The application of behaviour modification and reality orientation especially have highlighted a number of variables or components which appear to be potent instruments of cognitive and behavioural change.

CHAPTER 4: RELATING PSYCHOLOGICAL INTERVENTION STRATEGIES TO THE DEFICITS IN DEMENTIA

Having reviewed the main psychologically based intervention approaches to caring for the dementing elderly the next task is to attempt to assess qualitatively the degree of 'fit' between these procedures and the deficits, described in the first chapter, which characterize dementia. This is not an easy task, but judgements can be made, albeit with some subjectivity, about the potential relevance and utility of the methods at our disposal.

A Quasi-systematic Analysis of Intervention Strategies

The variability of the approaches reviewed in the section entitled "Approaches concerned with activity and stimulation" defies even a quasi-systematic analysis. However it is possible to identify the characteristics of both behaviour modification (BM) and reality orientation (RO), the two best developed models of intervention. How then do the procedures which characterize these two approaches relate to the primary deficits in dementia which as listed in Chapter 1 are deficits in intellectual functioning, memory for both recent and remote events, new verbal and spatial learning, arousal and attention, sensory and perceptual functions, language, conditioning, participation and social interaction, activities of daily living, confusion and disorientation, and spatial behaviour. Furthermore, how appropriate are these approaches given certain known characteristics of institutions for the dementing elderly such as the staff resources available, both in terms of skills and numbers, and the characteristics of the total resident/patient populations? Finally, how do these two approaches compare on the set of features commonly associated, to a greater or lesser extent, with all successful programmes of care? (Woods & Britten, 1978).

1. Deficits in dementia

(a) Intellectual functioning - neither BM nor RO addresses this directly. However the procedures of class RO exercise a wide range of intellectual abilities such as writing, reading, naming, vocabulary usage, etc. The emphasis is on using residual abilities to the full in structured exercises addressing the more general aim of orientation.

(b) Recent and remote memory - BM does not address memory impairment. Reality Orientation recognizes acquisition difficulties that relate to both STM and LTM by presenting information slowly, repeatedly and multi-modally. Retrieval deficits are recognized by provision of cues, partial information or unabashed "reminding", i.e., the staff guide recall and in the last resort act as a prop for the patient's memory. Physical aids to memory are also placed in the environment.

(c) New verbal learning - not addressed by BM. Reality Orientation constantly and repetitively provides new information in conditions of both massed (class RO) and spaced practice (24 hour RO).

(d) Arousal and attention - in relation to specific behaviours BM provides a suitable stimulus for the patient. The behavioural ergonomic or engineering approach described by Lindsley (1963) could potentially remediate deficits of attention and arousal. RO uses staff communication as an attention directing device. In class RO patients are trained to attend to the leader and the communication of others in the class.

(e) Sensory and perceptual deficits - not addressed by BM but RO employs large visual aids with good figure to ground contrast, clear auditory communication and class exercises which utilize all four senses. Orientation aids can be designed which compensate for restricted perceptual field.

(f) Language skills - neither BM nor RO train language skills with any degree of sophistication. RO does encourage patients to use language regularly however both in class and 24 hour procedures.

(g) Conditioning - through sophisticated behaviour analysis and contingent reinforcement BM clearly addresses conditioning. RO socially reinforces appropriate responses but through lack of appropriate behaviour analysis or specific programming procedures this is unlikely to be consistent enough to constitute conditioning.

(h) Participation and social activity - BM can effectively engineer 'engagement' through stimulus control and reinforcement procedures. Likewise RO prompts and reinforces patients naturally both on ward and in RO classes.

(i) Activities of daily living - BM specifies deficits and remediates them through appropriate contingent reinforcement. RO is less systematic and specific but emphasizes the maintenance of a wider range of self-care activities through staff prompting (demand pressure) allowing time for patient to perform and providing reinforcement.

(j) Confusion and disorientation - not addressed by BM but is the primary emphasis in RO through (i) provision of information, and (ii) correction procedures.

(k) Spatial behaviour - BM could potentially tackle this. RO provides signposts, colour coded doors and other prosthetic aids and has staff direct patients verbally to these.

2. <u>Limiting factors in care provision</u>

(a) Staff - patient ratio - most institutional facilities for the demented are seriously undermanned with low staff-patient ratios./

Behaviour Modification, with its emphasis on specific retraining strategies, consistent yet varied reinforcement strategies and record keeping, is intensive of staff time. Reality orientation, with the exception of the class procedure, emphasizes utilization of existing staff to patient contacts and the facilitation or maintenance rather than remediation of behaviour, thus placing less obvious demand on staff time than does BM.

(b) Staff training - most staff in institutional facilities are largely untrained care or nursing assistants. As long as this remains true the practicality of BM procedures would seem to be limited unless considerable skilled outside support is available. Although the basic principles are simple enough, the detail required in practice is such that problems related to (a) above would upset implementation. Reality orientation, on the other hand, developed specifically from a "grass roots" service setting, has a commonsense rationale and emphasizes the use of simple procedures within the grasp of largely unprofessional staff.

(c) Population characteristics. The prevalence of dementia within the populations of psychogeriatric hospitals and old peoples homes is high (Gilleard et al, 1980; and Masterton et al, 1979). The multiple deficits evident in such populations call for a management technique with multiple components. Clearly RO is such a technique although its cost-effectiveness has yet to be established.

3. Characteristics of successful programmes

(a) Intensity - programmes need to be operative for as close as possible to 24 hours a day, seven days a week, especially with more deteriorated patients. Numerous studies have demonstrated the fall in performance associated with programme withdrawal (e.g., Bower, 1967; Barnes, 1974; and Greene et al, 1979). For BM the implication of this is that the ratio of responses to reinforcements needs to be kept low and reinforcements need to be constantly monitored to ensure that satiation has not occurred. Thus specific deficits cannot be treated and then forgotten. To be intensive enough BM would need to provide several ongoing programmes for each of the many multiply impaired dementing patients in a section or ward. This, for reasons given in section 2 above, might well be impossible. Reality orientation, on the other hand, emphasizes 24 hour re-orientation in altogether a much more practical way. Perhaps though, the lack of objective specificity in defining exactly how this more global re-orientation is implemented, may, in effect, result in a programme of variable intensity.

(b) Participation - in both BM and RO the emphasis is on the need to have patients elicit a response to stimulation. Again though, the range of responses elicited by RO is likely to be greater than that elicited by RO (see (c) below).

(c) Stimulation - BM emphasizes specific stimulation and RO emphasizes the use of staff as a stimulus in every interaction with a patient. Thus the total social stimulation received by a patient in RO is likely to be greater than in BM.

(d) Motivation - Both BM and RO emphasize the need to increase patient motivation by extra personal attention, specific rewards or participation in interesting activities. In addition RO emphasizes the need for a "positive expectant" approach to be taken by staff in working with patients. Whether this is more motivating to patients than "contingent reinforcement" is not known. It is certainly quite different as "positive expectancy" is a prompt to behaviour and "contingent reinforcement" is a response to behaviour.

(e) Staff attitudes - there are indications that both BM and RO are positively received/evaluated by staff involved in these procedures. In addition RO has been shown to produce changes in general attitudes towards the elderly. This is probably related to the wide range of material about the characteristics of the elderly that is typically presented as part of an RO education "package". This consistency of staff to patient responses is addressed in both BM and RO.

This comparison of BM and RO in relation to dementia is necessarily subjective and takes no account of the relative effectiveness of different programme components. What it does indicate, however, is that RO, perhaps more than BM, has considerable face validity as an appropriate psychological treatment modality for dementia. Perhaps this is why the popularity of RO in practice has always outstripped its systematic evaluation. One aspect of RO which has never been emphasized in descriptions of the technique and which perhaps could never be measured is its potential reassurance value to grossly confused patients. As Arie (1978) commented "Programmes of reality orientation are well grounded both in common sense and in the principles of learning and one must exploit every incidental occasion to help orientate the confused person and to reassure her that the situation is in hand, that there has not been some ghastly mistake." He goes on to say "that even lasting confusion can be mitigated, often dramatically, by attention to the way we treat those who suffer from it, and to this end it is necessary to construct a satisfactory social environment." Reality orientation then is not simply a technique, the merits of which rest solely on its empirically demonstrated effectiveness in modifying cognitive and behavioural functioning. Having said that we should be sufficiently encouraged by both the evidence of its face validity and results from controlled trials to date to wish to investigate and evaluate further its effectiveness in the management of dementia.

CHAPTER 5. AIMS OF THE STUDY

The primary aim of the present study is to evaluate the effects of reality orientation procedures applied in the institutional care of the mentally impaired elderly. The progressive nature of the mental deterioration evident in dementia necessitates that this evaluation be conducted over a relatively extended time period. To date no study has investigated the impact of RO procedures applied for more than twenty weeks. Indeed most experimental evaluations to date have utilized considerably shorter time periods. The present study aims to apply a range of reality orientation procedures, arranged sequentially over a period of one year. This can be reasonably claimed to be a significant time sample in the span of dementing illness which is associated with considerably reduced life expectancy. Furthermore, it should be possible to measure the impact of RO procedures on the course of the illness over such a time period and test the speculation of some authorities (Miller, 1977 and Woods, 1981) that such procedures may slow down the process of progressive deterioration in function.

As pointed out earlier in the review of RO research studies there has been considerable variation in, and sometimes doubt about the exact diagnostic composition of the population samples used. The present study aims to utilize as far as possible a sample of elderly dementing subjects selected over the range from mild to severe impairment. This selection strategy will necessitate the inclusion of mildly impaired individuals for whom there is some diagnostic uncertainty. Such individuals will be identified in the sample description and their inclusion means that the total sample might be more conservatively described as mentally impaired rather than wholly dementing.

A large sample of N=60 is aimed for and again this is necessary because of the relatively small numbers utilized in previous studies. Table 11 describes controlled studies to date in terms of the samples employed,

Table11. Controlled Reality Orientation (RO) Studies to Date

STUDY	- SUBJECTS - SETTING - MEAN AGE	DIAGNOSIS	TREATMENT TESTED /AND DURATION
Citrin and Dixon (1977)	25 Geriatric Hospital 84 years	N/K	24 hour RO + class vs. nothing 6 weeks
Brook, Degun and Mather (1975)	18 Psychogeriatric Admission Unit 73 years	Senile and arterio. dementia	Class RO 16 weeks
Harris and Ivory (1976)	58 Psychiatric hosp. 69 years	CBS, OBS Syphilis Psychosis, etc.	24 hour + class vs. traditional care 5 months
Woods (1979)	18 Residential home 76.6 years	N/K	Class RO vs Social Therapy vs. nothing 20 weeks
Greene, Nicol and Jamieson (1979)	3 Psychogeriatric day hospital 70 years	Pre-senile + arterio. dementia	Individual question/answer orientation strategy
Holden and Sinebruchour (1978)	32 Geriatric hosp. 78 years	N/K	Class RO 12 weeks

numbers of subjects, diagnosis, time span and RO procedures investigated.

Consideration of Table 11 shows that only two controlled trials to date have tested the effects of 24 hour RO; the primary form of RO (Citrin & Dixon, 1977 and Harris & Ivory, 1976). In both studies the effects of 24 hour RO alone cannot be ascertained as this approach is combined with a class RO component. The present study aims to test both 24 hour RO and class RO applied both separately and in combination over both short and long durations and will be the first study to present data on 24 hour RO alone. This data will reflect changes in the cognitive and behavioural functioning of subjects exposed to this procedure. However, as 24 hour RO is an 'aide-centred' programme, to use the American terminology, the main premise is that only through certain modifications in the way staff handle patients, can beneficial changes occur in the patients. Thus to evaluate 24 hour RO it is necessary not only to look at patient but also at staff behaviour. The present study aims to introduce 24 hour RO in line with the implementation directions given in the only available RO manual (American Hospital Association, 1976) and answer the question "does the patient get the RO pill?" by monitoring changes in staff as well as patient behaviour.

In addition to examining the effects of 24 hour and class RO as therapy 'packages'; each with a number of specific and non-specific components, the present study will attempt to separate out and test the effects of two of the most integral components of RO, namely (i) staff to patient communication designed to orientate the patient, and (ii) provision of orientation aids in the physical environment, again designed to orientate the patient. As this investigation is not intended to undermine the integrity of RO as a package of procedures the use of an analogue design arranged in parallel to the main investigations of 24 hour RO and class RO applied 'in toto' enables the effects of these components to be ascertained without disruption to the main purpose of the study.

A further aim of the present study is to examine more closely who, if anybody, benefits from RO procedures. Both Brook et al (1975) and Greene et al (1979) provide support for the view that the mildly demented elderly benefit more than their more gravely demented peers. Furthermore the nature of the setting in which care is provided and RO offered may influence the outcome. For example, it is not unreasonable to expect that, given the contrasting ethos of care in psychogeriatric hospitals and local authority run old people's homes, together with the fact that the former has a larger proportion of the more severely demented elderly, that RO may have different effects in these two settings. Positive findings for RO have been demonstrated in a psychogeriatric hospital (Brook et al, 1975; and Citrin & Dixon, 1977), in a home for the elderly mentally impaired (Woods, 1978), and in a psychogeriatric day hospital (Greene et al, 1979). The present study will examine RO applied in the two main residential settings caring for the dementing elderly in Scotland, namely a psychogeriatric hospital and a local authority run old people's home.

Note: During the course of the actual study conducted it became apparent that certain other issues were worthy of examination. In particular the views of others, notably the non-dementing elderly and staff working with the elderly, towards RO, seemed to be important aspects of an overall evaluation of the RO approach. It has been shown in other studies that the elderly themselves often hold negative attitudes towards age peers and their rehabilitation potential (Kosberg & Gorman, 1975; Kahana & Coe, 1969). During the present study it was apparent that the demented subjects employed in the home were in some measure castigated by their non-dementing peers. The question then of the perceived intrusiveness of (1) the dementing elderly themselves and (2) the RO procedures designed to help them, in the eyes of the non-dementing elderly was examined. The findings are presented in the Appendix and refered to in the main discussion.

Likewise, given some evident variability in the perception of RO by staff, a brief attempt was made during the study to evaluate the reaction of a group of multidisciplinary professional staff working with the elderly, towards a video of the RO procedures used in the study. Some writers have accused RO of treating the elderly in a generally dehumanising way and imposing an irrelevant or inaccurate 'reality' (Gubrium & Ksander, 1975; Wershaw, 1977). The results of the brief evaluation conducted, presented in the Appendix, give some idea of whether these views are generally shared by staff working with the elderly.

DESIGN AND METHODOLOGY

CHAPTER 6. DESIGN AND METHODOLOGY

The study comprises a number of separate experiments linked in sequence. These are described in logical order in the chapters to follow where a precise description of the methodology of each will be given. It will suffice in this chapter to present a general description of method and design for the study as a whole.

1. Population Base

The settings selected for the study were Wards 14 and 16 of the long-stay psychogeriatric area of the Royal Edinburgh Hospital and Marmion and Mannering sections of Greenlea Old People's Home, Edinburgh, a local authority run home of some 300 beds. As resources available to the study made it impossible to implement the multitude of preliminary, assessment and intervention procedures required in both the hospital and home settings at the same time it was decided to stagger implementation, starting first with the hospital and proceeding with similar procedures in the old people's home after six months. Both hospital and home were situated in the same area of Edinburgh, making it possible for staff involved in the study to work easily in both settings during the period of overlap when work was proceeding simultaneously. In a general sense the layout of the two units in both hospital and home were remarkably similar. All four were older Nightingale-type units with a central corridor running from one end to the other and in both home and hospital the units were arranged directly one above the other and had almost identical floor plans. The number of beds was between 30 and 40 on each. A 'therapy room' for the almost exclusive use of the study was made available in one of the units in both the hospital and the home. Thus facilities for assessment and treatment were in close proximity to the population used.

At the outset an N of 80 subjects was aimed for, comprising 20 subjects from each unit. This allowed for the adoption of fairly strict selection criteria which would necessarily exclude a number of patients/ residents in each setting as unsuitable for inclusion. Both units in the hospital were female psychogeriatric and it was therefore decided at first to study only a sample of females even though the units at the home were mixed, albeit with a smaller proportion of males. However, given the exact nature of the population at the home which became evident only after the study had commenced in the hospital, it was necessary, due to lack of suitable subjects to (a) reduce the sample in the home to 20 instead of 40 with 10 selected from each unit and (b) include males in the home sample. Thus the total sample for the study was reduced to 60 selected according to the criteria below.

2. Selection of Subjects

Subjects were selected through the joint criteria of (a) score on the Koskela battery of psychometric tests indicative of mild-severe mental impairment (dementia) and (b) a psychiatric diagnosis of dementing illness recorded on file. These criteria were met by all subjects selected in the hospital but at the home the diagnostic information available was in many cases hazy or inexact reflecting a different set of admission procedures and policies in this setting. Therefore it was necessary, given that an independent psychiatric assessment was not available, to accept a less exact definition of (b) above as being reference in the history to descriptions of symptoms indicating, but often not actually diagnosing, dementia. The psychometric assessment procedure adopted will be described later in more detail.

It was quickly apparent that the majority of suitable subjects in the hospital fell into the category of grave dementia as defined by the Koskela test. Given the aim of establishing the effectiveness of RO procedures with elderly suffering differing degrees of dementia it was necessary to give first preference in selection to those in the mild to moderate range and where more than 20 suitable subjects were available in a unit, exclude the excess number from the gravely demented group. No policy of excluding subjects with additional problems of ambulation, speech, vision or hearing was adopted, as indeed in both hospital units these subjects were needed to bring the sample up to size. In neither unit did the number of suitable subjects greatly exceed the number actually required. An important component of the selection procedure involved asking the care staff to make suggestions as to who they thought should be included in the research programme. This did not in any way modify the more rigid criteria described above.

The predominance of gravely demented subjects in the hospital sample was compensated for in the home, where the majority of subjects were in the mild to moderate range. Here, again with the view of establishing equal numbers in each unit, gravely demented subjects were excluded in préference to the less impaired.

3. Matching of Subjects

A 'degree of dementia' score from 0 = no impairment to 10 = grave impairment can be derived from the Koskela Test total score. This score was used to classify subjects into the categories of mild, moderate or grave impairment. Within each unit subjects were stratified according to their degree of dementia scores and then, within each strata in turn, randomly allocated to experimental or control groups of equal number. The stratified balanced random sampling procedure in the home involved stratifying according to sex as well as degree of dementia.

The characteristics of the total sample are shown in Table 12.

Table 12

Details of Study Population

	Hospital	Home	Total
Number	40	20	60
Mean age	79	81	80
Mean length of admission (yrs)	3.8	3.5	3.7
Sex (M + F)	40F	15F 5M	55F 5M
Diagnosis:			
Senile dementia	34	8	42
Arteriosclerotic dementia or cerebral arteriosclerosis	4	5	9
Alcohol related dementia	2	-	2
Korsakoff	-	1	1
No diagnosis	-	6	6
Dementia:			
Mild	7%	15%	10%
Moderate	27%	45%	33%
Grave	66%	40%	57%

4. Sequential Intervention Model

Using the cohort of 60 subjects just described, equally divided into experimental and control groups, a number of experiments were run in a developmental sequence over a period of one year. The temporal strategy involved started with a trial of the most easily implemented and controllable component of RO, namely class RO. This was provided to the 30 experimental subjects for a six month period, with the matched control group receiving no treatment. Class RO was provided four times per week for the first three months, reduced to two times per week for six weeks and withdrawn altogether for the last six weeks.

Following this evaluation of class RO alone came a six month trial of 24 hour RO. This was provided to half the subjects in each of the experimental and control groups of the first experiment. In the hospital sample allocation of subjects was again achieved by matching on degree of dementia and then randomly allocating subjects within the same strata to experimental and control groups respectively. Class RO was re-introduced four times per week for this second six month period and all subjects who received class RO in the first experiment received this same procedure throughout the second experiment. Thus the second experiment tested four treatments vis class RO alone vs. class RO plus 24 RO vs. 24 RO alone vs. control. Moreover the four treatments were balanced within each of the two hospital wards. An alternative and more logical design that was considered was to make one ward an experimental (24 RO) ward for this second experiment and the other a control ward. This would have separated treatments more effectively without controlling of course for possible location effects. It was not possible to use this design as staff on both wards were reluctant to apply 24 RO with more than a few patients at a time. Thus to make use of the full sample (N = 40) and have half (N = 20) in a 24 RO condition it was necessary not only to use 24 RO in both units but also to stagger the timing of the 24 RO so that within each unit half of the 24 RO subjects received the procedure for the first three months and half received it for the second three months.

This rather unsatisfactory experimental arrangement was brought about by a number of factors operating in these rather custodial units. The difficulties experienced in implementing 24 RO in the hospital units are discussed later. Within the two units of the old people's home the situation was quite different, however. Here it was possible to achieve an experimental vs. control ward design for the experiment on 24 RO. Figure 3 shows the main experimental design.

A number of experiments will be reported from the above trials vis.

Experiment 1. This will report the results for class RO over the short term periods 0-3, 0-6 and 3-6 months for the total sample (N = 60). The effect of the variables degree of dementia and type of care setting will be examined, together with the effect of implementing and then withdrawing class RO.

Experiment 2. This will report the effects of class RO applied in the long-term period 0-12 months with a reduced sample (N = 40). The effect of degree of dementia will be tested but not type of care setting as not enough subjects from the home will be eligible for inclusion.

Experiment 3. The design for Experiment 3 requires special consideration as it overlaps the main trials of class RO and 24 hour RO described above. This experiment was designed to test the relative effectiveness of two components of 24 RO, namely (1) staff to patient interactions and (2) the provision of prosthetic orientation aids in the environment. Moreover it was intended to prescribe the staff to patient interaction as a behaviour training interaction as compared to the primarily verbal orientation style of class RO. It was thus hoped to demonstrate that behaviour change can result from behaviourally based as opposed to purely verbal RO procedures. Six patients from the hospital sample receiving class RO were randomly selected and provided with ward orientation training in addition to the class RO sessions for a number of weeks during the period 0-3 months of the main class RO experiment. These six patients, treated in detail as single case studies, were also matched with six patients receiving class RO only, on degree of dementia. Thus not only could the effect of introducing

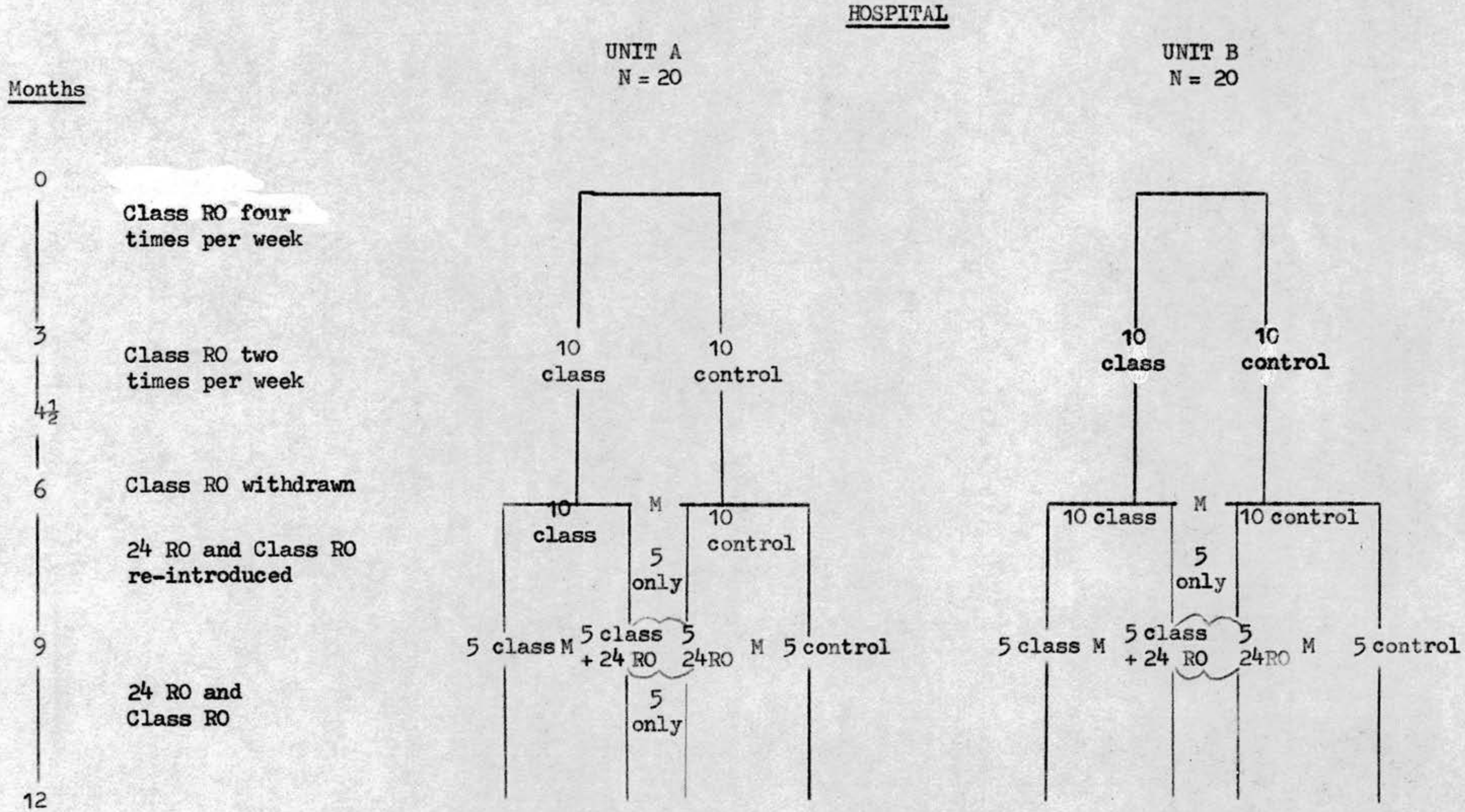


Figure 3. Design of main trials of class and 24 hour RO.

M = matching procedure employed

Figure 3. Continued

Months		HOME: UNIT C N = 10			UNIT D N = 10		
0	Class RO four times per week	5 class		5 control	5 class		5control
3	Class RO two times per week						
4½							
6	Class RO withdrawn	5 class + 24 RO	M	5 control + 24 RO	5 class	M	5 control
	24 RO and Class RO reintroduced						
9		5 class + 24 RO	M	5 control + 24 RO	5 class	M	5 control
	24 RO and Class RO						
12		5 class + 24 RO		5 24 RO	5 class		5 control

M = matching procedure employed

and withdrawing the ward orientation procedure be tested through an ABABA design but it was also possible to compare groups (N = 5) on class RO plus ward orientation vs. class RO only on a range of cognitive and behavioural variables. Thus in effect an analogue trial of 24 RO interaction procedures was set up during the phase when class RO only was being tested on the complete subject sample. By placing this training procedure in the hands of research assistants and not ward staff contamination of the main experiment on 24 RO, likely if 24 RO was partially introduced to staff before month 6, was avoided. Also the possibility that the 24RO may turn out not to produce measurable changes in the way staff manage patient behaviour was considered - the use of research assistants to conduct operationally prescribed ward orientation training ensured that the "patients got the behavioural RO pill" in much the same fashion that occurs in class RO. The implementation of ward orientation in the first three months allowed some four months follow-up of this procedure before ward-wide 24 RO commenced at month seven. This was the point when prosthetic memory aids were introduced including three dimensional signposts labelling different parts of the ward environment. The effect of these signposts on spatial orientation was thus tested at this time, with or without a condition of further orientation training. A similar but smaller scale trial of ward orientation training as an analogue of 24 RO was conducted with two subjects in the old people's home. The design of Experiment 3 in relation to the main study is shown in Figure 4.

Months	Main trial	Experiment 3
0 - 3	Class RO continuous	Ward orientation training for 6 class RO subjects applied and withdrawn in phases ABABA over weeks 4 to 10.
3 - 6	Class RO reduced and withdrawn	Follow-up period for ward orientation subjects
6 - 12	Class RO re-introduced tog. with 24 RO for some subjects	Ward orientation re-introduced for some of the single cases either just before or after introduction of signposts. Effect of signposts tested with and without training.

Figure 4. The sequential design of the RO analogue trial (Experiment 3) in relation to the main study.

Experiment 4. This will report results for 24 hour RO vs. class RO plus 24 RO vs. class RO vs. no RO for the three month period between months 6 and 9 in both hospital and home.

Experiment 5. This will report the results for 24 hour RO vs. class RO vs. 24 hour RO and class RO vs. no RO over the longer six month period between months 6 and 12. This analysis is restricted to the home sample only as the 24 hour RO experimentation was terminated, for reasons to be explained later, after three months of application in the hospital.

Experiment 6. As Experiments 1-5 are solely concerned with reporting on changes in the sample of subjects this study will report on changes in staff behaviour before and after the introduction of 24 hour RO in both home and hospital.

Note: The final study conducted in the sequence, was carried out shortly after the other studies were complete. This study examined the attitudes of the alert residents in the two sections of the home to the confused residents and the RO procedures adopted over the previous year of the programme. This is presented in the appendix.

5. Measures

A range of measures of both cognitive and behavioural functioning were employed.

(i) Cognitive measures:

(a) Koskela Test. This served as a general measure of cognitive functioning with subtests measuring comprehension, verbal orientation, memory, paired associate learning, and concentration. A modification of the Isaacs and Walker test, this test has been shown to differentiate fairly successfully between the normal elderly and those with impaired brain function, and to match the degree of behavioural impairment (Ferm, 1975). The Koskela was employed at months 0, 3 and 12 with all subjects and served both as an independent measure of treatment effect and as a means of matching groups of subjects according to degree of dementia. The comprehension subtest was omitted as it proved too difficult for the majority of subjects in the sample. Total score was prorated from the total of the remaining four subtests (see Appendix 1).

(b) Extended test of verbal orientation. A primary emphasis of RO is to improve levels of time, place and person orientation through application of verbally based orientation strategies. The assessment of orientation has traditionally been accomplished through the application of short, verbal, orientation questionnaires often described as mental status questionnaires. Such questionnaires rarely contain more than ten items and are used primarily for purposes of differential diagnosis and screening rather than the monitoring of treatment effects. Thus it was necessary to design an extended orientation questionnaire which might prove more sensitive to the effects of treatment and contain enough items for sub-scores to be derived for time, place and person orientation. This was achieved by pooling items from three existing short orientation questionnaires vis. The Orientation Test (Irving et al, 1970); The Reality Orientation Information Sheet, Reality Orientation Training Programme 1975, and the Koskela Test. In addition a small number of other items were added to make a twenty-five item questionnaire which contained a combination of items of general orientation, e.g., "what day is it?", and items relating more to personal circumstances, e.g., "who comes to visit you?". This extended orientation questionnaire is shown in Appendix 2. Altogether 12 items measured time orientation, 4 items measured place orientation and 7 measured person orientation, after 2 items, which could not be reliably administered, were dropped. Sixteen of the items were scored 2, 1, 0 reflecting correct, partially correct and incorrect answers respectively. The remaining seven items were scored according to the quality as well as the correctness of the answer. Thus on these items it was possible to score points for incorrect responses provided these responses were appropriate, e.g., Question 7 "How old are you?" Answer: "a right age". The maximum score on this test was 60. The test was administered at months 0, 3, 6, 9 and 12.

(ii) Behaviour measures:

(a) Geriatric Rating Scale (Plutchik et al, 1970). This revision of the Stockton Geriatric Rating Scale, (Meer & Baker, 1966), is a highly reliable and relatively valid measuring instrument for assessing the behavioural states of psychogeriatric patients. Factor analysis of the 31 items by Smith,Bright et al, (1977) revealed three factors: deficits in activities of daily living, withdrawal/apathy and antisocial/disruptive behaviour. The scale can be reliably administered by nursing staff and is shown in Appendix 3. The GRS was administered at months 0, 3, 6, 9 and 12.

Inter-rater reliability for both total score and subscale scores on the GRS for a sample of 8 ratings by each of two raters in the hospital and 9 ratings by each of two raters in the home is shown in Table 13

Table 13

Inter-rater Reliability of GRS in Hospital and Home
(Spearman's r_s)

	Hospital	Home
GRS total	0.93 **	0.70 *
Activities of daily living	0.97 **	0.64
Withdrawal/apathy	0.93 **	0.66
Antisocial/disruptive	0.81 *	0.76 *

** $p \leqslant 0.01$
* $p \geqslant 0.05$

(b) Ferm's fields of behaviour. In describing the behavioural activities of demented geriatric patients Ferm (1974) examined thirteen behavioural variables, each scored on a six point scale. As mentioned earlier in the Introduction the scores on most of these variables correlated well with the Koskela test of general cognitive impairment. Moreover the pattern of scores revealed similarity between different degrees of dementia. Some behavioural activities seemed to disappear at the onset of the illness, whereas others were not lost until a late phase. Certain abilities appeared to be lost quickly while others deteriorated more slowly. Thus although these results were obtained from a cross-sectional study design the behavioural variables used by Ferm were included in the present study in the hope that they might reveal differences between treatment and control groups examined longitudinally over one year. The ratings on these variables were completed at the same times as the GRS. The variables and scoring criteria are shown in Appendix 4.

Inter-rater reliabilities for (i) total score and (ii) the individual behavioural variables for a sample of 8 ratings by each of two raters in the hospital and 9 ratings by each of two raters in the home are shown in Table 14.

Table 14

Inter-rater Reliability of Ferm's Behaviour Fields in Hospital and Home
(Spearman's r_s)

	Hospital	Home
Ferm total	0.99 **	0.94 **
Ability to move	0.81 *	0.61
Ability to wash	0.90 **	0.79 *
Ability to dress	0.93 **	0.77 *
Ability to eat	1.00 **	0.89 **
Control of the bladder	0.75 *	0.52
Control of the bowels	0.98 **	0.93**
Ability to communicate	0.77 *	0.78 *
Orientation in space	0.95 **	0.37
Recognition of persons	0.93 **	0.75 *
Participation	0.94 **	0.32
Hobbies	0.83 *	0.24

** $p < 0.01$
* $p > 0.05$

(c) <u>Ward orientation test.</u> A direct measure of ward orientation performance was developed for the purpose of providing a behavioural as opposed to purely verbal measure of orientation. The test involved the subject identifying in turn a number of pre-established locations in the ward environment namely the front door, bedroom, toilet, kitchen, dining room and sitting room. Each location was scored 2, 1, 0 depending on whether identification was made independently and correctly, correctly with the aid of a pre-established clue or incorrectly. Ward orientation was tested at the same intervals as verbal orientation.

(d) <u>Direct observational behaviour ratings.</u> As the behaviour ratings listed above give little or no information on social behaviour and general behavioural 'engagement' with the environment a Ward Social Behaviour and Activity Rating Scale was developed to monitor these variables over the course of the study (see Appendix 5). A twelve category behavioural code was used to measure (1) location of the subject in the setting; (2) social interaction: (a) prosocial, (b) non-social, (c) antisocial); (3) activity level: (a) passive - sitting, lying; (b) active - walking, standing; (4) activity type: (a) passive - watching T.V., reading, etc.; (b) active - dancing, knitting, etc.; (5) interaction pattern: (a) with another patient, (b) with a group of patients, (c) with a staff member, (d) with others, e.g., visitors. A time sampling procedure was employed to record behaviour during fixed morning (9.30-11.00 a.m.) and afternoon (2.00-4.00 p.m.) periods at each of months, 0, 3, 6, 9, and 12. Behavioural items in each category were operationally defined and agreement between raters (shown in Table 15) was so high in each that Kappa was not calculated.

As will be shown later the consistency of this data was also high.

Table 15

Inter-rater Agreement for Different Behavioural Categories on the Ward Social Behaviour and Activity Scale

1. Social Behaviour

	Prosocial	Nonsocial	Antisocial	
Prosocial	60	11	2	agreement = 92%
Nonsocial		107		
Antisocial			1	

2. Activity Type

	Active	Passive	No activity	
Active	15		3	
Passive		16	2	agreement =95%
No Activity		2	133	

3. Activity Level

	High level	Low level	
High level	52	3	agreement =98%
Low level		125	

4. Interaction Type

	Patient	Group Patients	Staff	Other	Nobody	
Patient	25		1	1	4	
Group patients		1			1	
Staff			7			agreement = 97%
Other				15		
Nobody					127	

5. Location

+	-	
180		agreement = 100%

(e) Staff-patient behaviour scale. This scale was specially developed to monitor changes in staff to patient behaviour following the introduction of 24 RO (see Experiment 6). A number of discrete, readily observable aspects of staff to patient communication, derived from the Staff Procedures Inventory of the Reality Orientation Training Programme (American Hospitals Association, 1976) were selected as a sample of 'RO behaviours' (see Appendix 6). These included EPV - staff engaging the patient verbally; SNP - staff calling the patient by name; SNS - staff introducing themselves by name; SEP - staff explaining a procedure; RTP - staff referring to time or place; SRP - staff referring to orientation aid or prop. These items were not intended to comprehensively measure the characteristics of staff to patient communication but rather to measure the extent to which the most basic and readily describable features of RO communication were being implemented. Again a time sampling procedure was used with all staff to patient interactions monitored for each of the eight one-hour intervals between 9-5 p.m. Thus a count of the total number of staff-patient interactions could be made for a full eight hour period before and after the implementation of 24 RO. Thus a direct measure of the intensity of RO together with a measure of RO 'quality' was obtained. For obvious reasons these ratings were made under the guise that patient behaviour ratings only were being made. Inter-rater reliability checks were attempted but given the low frequency of staff-patient interactions and the general low quality of these interactions these efforts were abandoned as being impractical. However the high reliability and consistency of the Ward Social Behaviour and Activity ratings suggests that the similar rating procedures adopted for staff-patient behaviour ratings were adequate.

A number of other evaluation procedures were used for specific purposes in certain of the studies. These were not main measures and a description will be left to be given later in the methodology of specific experiments.

6. Measurement Procedures

(i) Prescreening. Prior to formal pretest the total pool of available subjects in all settings were interviewed briefly, asked to co-operate with answering some questions and administered a specially devised "warm-up" test consisting of selected items from each of an orientation questionnaire, the Wechsler Memory Scale, the Visual Counting Test (Fishback, 1977), the Set Test (Isaacs & Akhtar, 1972), Maze learning (Williams, 1956), the Delayed Recall Test (Williams, 1968) and the Block Design subtest of the W.A.I.S. (Wechsler, 1955).

This prescreening provided (a) a chance for all subjects to become acquainted with the test situation and thereby achieve a closer to optimal performance on the pretest to follow. This avoided unduly deflated scores on the pretest and the possibility of inflated treatment effects reflected in later repeated measures. Stonier (1974) has pointed to the mislabelling that can occur if reliance is placed on a single administration of a mental status questionnaire and the intent of the "warm-up" test was to reduce this effect in the actual selection of experimental subjects on pretest; and (b) an opportunity to test out the appropriateness of a range of assessment instruments on the population concerned. On a number of components of the "warm-up" test the majority of subjects in the hospital failed to score above the lowest point. These tests which included the set test, delayed recall test and the maze learning were dropped as inappropriate monitoring instruments for the total subject group. Several tests including those just mentioned also proved too time-consuming for repeated administration on a large subject sample. The prescreening proved extremely useful in pointing out the difficulties in administering a number of tests to a demented population and allowed a rational basis for the selection of the measures employed. Some additional relevant information concerning the administration of a number of the selected measures is presented below.

(ii) Assessment of orientation. The extended orientation questionnaire was considered too long to be administered in a single session. To reduce subject fatigue it was divided into three sections and administered over a two week period. The three sections each administered in a separate session were presented in a fixed order for all subjects. An independent tester was employed who was initially unaware of the experimental allocation of each subject. This blinding procedure was not wholly effective over the duration of the study as information concerning allocation of subjects came to the attention of the tester from a number of sources including ward staff and the subjects themselves. The tester always attempted a few minutes of general conversation before introducing the questions. Responses were written down verbatim and questions were repeated once if necessary. Responses were scored according to a set of pre-established instructions/criteria (Appendix 7).

(iii) Ward orientation. This was tested in the second week of testing on the extended orientation questionnaire. The same tester was employed and introduced the test by asking subjects if they would show her round the ward/section. A fixed route was followed and subjects were scored for success or failure in demonstrating each of six locations.

(iv) Behaviour rating scales. In consultation with the ward sister or section supervisor in each of the four settings two raters were selected for each. Only staff who had worked in the setting for a minimum of three months were considered. In all but one case the raters were nursing or care assistants. Each rater was seen individually by the experimenter who explained the general purpose of the two scales employed. Each rater was provided with a set of rating instructions and together with the items these were gone over and explained with the experimenter present. Raters were asked to rate the subjects at the end of a given week (week 2 of the orientation testing). Subjects were randomly allocated to raters for the pretest and in subsequent retests the same raters rated the same patients. In the home where male subjects were included a male rater was employed for the males and a female rater for the females. Ratings were collected and scored by the experimenter immediately after completion. It was not possible to blind these ratings and on some occasions they were completed up to a week late of the target. One rater was lost during the course of the study and replaced.

(v) Ward Social Behaviour and Activity Rating Scale. A time sampling procedure was employed for these direct observations. The ratings for each subject were recorded on a separate sheet by a moving observer. These sheets were shuffled between observations to randomize the order in which subjects were observed. Two sets of three morning ratings and one set of three afternoon ratings were made for each subject during the two week period when the orientation tests and behaviour rating scales were being completed. Initially on pretest a larger sample/(x 2) i.e., more frequent of ratings were made and the consistency of the smaller sample calculated by correlating scores on the two sets of data for each behavioural variable for the forty subjects in the hospital settings. The correlations, shown in Table 16, were nearly all highly significant and indicated considerable consistency in the behaviours observed. Thus the smaller data sampling was accepted as sufficient for the purposes of the experiment.

The rating instructions and operational definition of each behavioural category are given in Appendix 8. These were based to some extent on the categories adopted by Blackman et al, 1976. It should be noted that these direct observation procedures were designed as an inexpensive alternative to the introduction of video recording procedures which would have proven costly, cumbersome and perhaps inefficient as video cannot monitor an entire ward environment. The intrusive effect of the rater appeared to be minimal and this is supported in part by the low frequency of observations in the 'interacting with others' category (Table 16) which includes all ratings of occasions when subjects were observing the rater. The same independent rater as used in orientation testing was employed for these ratings except in the first months of the experiment when a post-graduate clinical psychology student was used. Inter-rater reliability, as already reported was high. Although a time sampling procedure was employed the behaviours observed were more molar than molecular and though not observed in their entirity they reflect clearly the pattern of social behaviour and activity in these institutional settings.

Table 16

Correlation of scores for 9 vs. 18 observations on each category of the Ward Social Behaviour and Activity Rating Scale for the forty hospital subjects

	Category	Correlation	
Social behaviour	(Prosocial behaviour	0.96	(N.B. no antisocial behaviour in either sample)
	(Nonsocial behaviour	0.96	
Activity type	(Passive activity	0.73	
	(Active activity	0.96	
	(No activity	0.93	
Activity level	(Active level	0.92	
	(Passive level	0.92	
Interactions	(Interaction with patient	0.94	
	(Interaction with group	0.98	
	(Interaction with staff	0.54	
	(Interaction with others	0.84	
	(Interaction with nobody	0.96	

(vi) Staff-patient behaviour scale. A combined event and time sampling procedure was employed. All interactions between staff and selected subjects over an eight hour period were counted and rated according to the criteria already described. The eight hour observation period was broken into eight one hour segments representing each hour between 9 a.m. - 5 p.m. and randomly allocated over the five days preceding the introduction of staff training in 24 hour RO. The same observation periods were repeated over five days ten weeks after the staff training was completed. This event sampling procedure would not have been possible but for the low frequency of staff to subject interaction. Where interactions were ambiguous and could not be readily rated they were described verbatim on the rating sheet and analysed later.

(vii) Repeated measurements. As already indicated a number of the measures employed in the study were repeated on up to five occasions. Every effort was made to ensure that each subject irrespective of setting was administered the same measures at the same points in the experimental sequence. This was only possible by allowing a full two week period for the collection of assessment information. The allocation of these two week periods throughout the span of the study is shown in Figure 5.

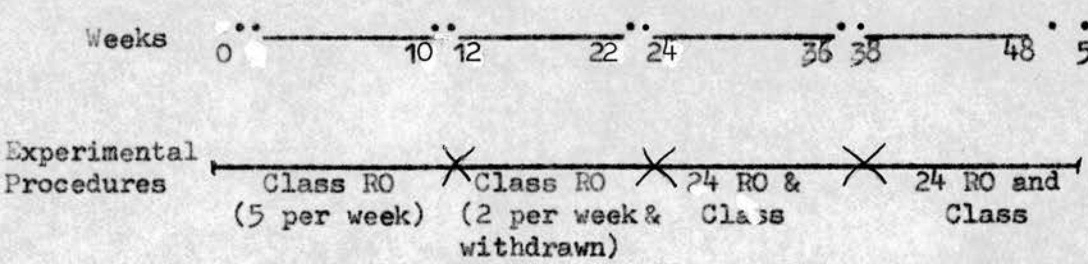


Figure 5. The relationship of repeated measurements to experimental time span. (.. Assessment periods)

7. Treatment procedures

Details of the treatment procedures and methods of implementation will be described in the methodology of the individual experiments.

THE EXPERIMENTAL STUDIES

CHAPTER 7: EXPERIMENT 1

An Evaluation of the Short Term Effects of Implementing and then Withdrawing a Programme of Classroom RO with Dementing Subjects

Introduction

Studies to date provide conflicting evidence as to the effectiveness of class RO in modifying the cognitive and behavioural deficits associated with mental impairment in the elderly. Brook et al (1975), Citrin and Dixon (1977) and Woods (1979) demonstrated significant improvements whereas Barnes (1974) and McDonald and Settin (1978) showed no benefit. Greene et al (1979) demonstrated improved verbal orientation for single cases provided with a modified approach involving the presentation of orientation information only on a one to one basis. Improvements quickly returned to baseline when this procedure was withdrawn.

The present experiment aims to (i) test the effects of class RO on the cognitive and behavioural functioning of a significantly larger sample of dementing subjects than has been employed in the earlier trials; (ii) test the effect of degree of dementia on the outcome of class treatment; (iii) test the effect of residential care setting on the outcome of class treatment; and (iv) test the effect of reducing and then withdrawing the class sessions. Given the real cost in terms of staff time of providing regular class RO in settings which are often suffering staff shortages, it is necessary to determine whether the improvements that may be predicted as a result of regular class RO treatment can be maintained in any measure if the treatment is gradually withdrawn.

Method

Subjects. Sixty subjects were selected as already described and allocated to experimental and control groups matched for sex and degree of dementia. Experimental subjects (n = 30) were randomly allocated into groups of 5 for the purposes of RO treatment. Early loss of subjects through death or transfer resulted in one of the groups in the home being reduced to 3.

Design. In the two weeks prior to the commencement of class RO all subjects were assessed on the Koskela test, the Extended Orientation Questionnaire and the Ward Orientation Procedure. Ratings on the Geriatric Rating Scale, Ferm's Fields of Behaviour and the Ward Social Behaviour and Activity Rating Scale were also completed during this time.

On commencement of treatment experimental subjects received class RO, scheduled at a regular time, four times weekly for twelve weeks. Re-assessment on the measures listed above was completed in the last two weeks of this phase. This was followed by six weeks of class RO provided twice weekly and then six weeks with no class RO provided. A third assessment was completed in the last two weeks of this phase for all measures bar the Koskela test. Control subjects were not provided with class RO but were assessed at the same intervals described above.

Treatment procedure. A specially equipped classroom area was established in both the hospital and the home. Equipment included a 4' x 3' white metallic orientation board complete with specially prepared information units consisting of 2" high white capital lettering on contrasting black perspex strips. These were provided with magnetic tabs on the back surface and could be easily place on and pulled off the orientation board. This enabled subjects to actively participate in placing information on the board during classes. This was one of several procedures adopted to ensure active involvement of the subjects, which has been shown by

Brook et al (1975) to be a variable important in outcome. The information units detailed days, dates, months, year, name of the hospital (home), the name of the ward or section, the local city, seasons, holidays, meals and weather conditions. These could be inserted to complete the blanks in other information units reading, "The Day is ....", "The Year is...", etc. Written information could also be presented by the therapist using dry-wipe marker pens.

Other classroom equipment included a large white clock with contrasting black hands; large, easily readable monthly calendars, maps, posters, personal drawing boards and miscellaneous items appropriate to the season which included a variety of herbaceous displays and holiday decorations. Both classrooms had large windows overlooking garden areas enabling direct access to information on weather, season, etc.

Classes met for half hour sessions under the direction of one of two therapists specially employed and trained for that purpose. Both were trained in class RO by the writer, who in turn had been trained at the Reality Orientation Training Program, Veterans Hospital, Tuscaloosa, Alabama. This therapist training was conducted before the class RO treatments commenced and involved: (1) teaching therapists about the cognitive deficits associated with dementia; (2) repeated observation and discussion of a class RO video tape (Hodge, 1979) and tape slide presentations from an RO training manual (American Hospital Association, 1976); (3) written handouts and (4) role-playing and supervised sessions with patients. Role-playing involved rehearsal of specific class RO procedures such as strategies for getting subjects to learn each other's names and ways to vary the degree of leader guidance and provide reinforcement. Equally important was the emphasis on less specific features such as slow, clear speech, frequent repetition of questions and answers and a generally unhurried approach.

Class sessions were run according to the basic criteria established by the originators and reported in Drummond et al (1978). Emphasis was placed on rehearsal of basic and advanced orientation information in a relaxed social atmosphere. Basic information primarily involved completion of the RO board, together with personal introductions and discussion of the time. Where possible this was linked in some way to earlier sessions. Advanced information was typically presented in the form of themes specially prepared by the therapist in advance. These themes provided information which related closely to people, places and the ongoing passage of time. They provided an opportunity for more extended discussions of current events and allowed subjects an opportunity to make active contributions and relate past memories to the present day. On the days before Burns' Night, for example, group members discussed who Burns was, where he lived, recited some of his poetry and discussed the preparation and content of the traditional haggis supper. Another theme involved examining postcards of famous Edinburgh buildings, naming them and locating them on a map of the city. Less structured themes were also used. The end of June was a suitable time to discuss summer holidays, where subjects used to go, what they did, where tourists go in Edinburgh, etc. The content and presentation of the advanced themes was of course limited by the abilities of subjects concerned. Less use of advanced themes was made in the hospital than in the home. In both settings, however, the class always started with, and indeed was largely taken up with, completion of basic information on the RO board.

Care staff in the settings assisted with the RO classes on a rota basis. This increased their identification with the programme, hopefully reduced suspicion of the therapists who were from outwith the settings concerned and provided an early introduction to the approach which was to be extended later when 24 RO was introduced.

Results. In order to establish that the experimental and control groups were adequately matched at pretest a series of one-way ANOVAS were completed. The pretest scores of the experimental and control groups were compared on all measures except those derived from the Ward Social Behaviour and Activity Rating Scale. No significant differences were revealed between the groups on any of the measures, suggesting that at pretest the class RO and control groups were, indeed, adequately matched (see Appendix 9). The mean initial pretest scores and standard deviations on all measures for the class RO and control groups in both the hospital and the home are shown in Table 17.

A series of four-way ANOVAS for repeated measures were carried out for each measure. The factors used were treatment (class RO vs. no class RO), place (hospital vs. home) and degree of dementia (mild vs. grave). For the purposes of these analyses the median point in the range of degree of dementia scores was established in order to provide two equal sized groupings on this factor. A Koskela score of 27 was the median point and as indicated in Table 18 this determined that the 'mild' dementia group for the purposes of analysis included all those subjects in the mild, moderate and first band of the grave dementia classification of the Koskela.

This data reveals that the sample was skewed towards the grave end of the degree of dementia scale and that the mild group in the analysis contained a sizeable number of dements, classified according to the Koskela test as moderately or gravely demented. The measures were at pretest (week 0), after class RO (week 12) and after class RO withdrawal (week 24).

Table 18

Grouping of Koskela scores and subsequent dementia classification of subjects for purposes of analysis

Raw score (Koskela)	Degree of dementia	Grade of dementia	Analysis grouping
>84 75-83	0 1	Normal	MILD (N = 29)
66-74 57-65	2 3	Mild	
47-56 37-46	4 5	Moderate	
28-36 19-27 10-18 1-9 0	6 7 8 9 10	Grave	GRAVE (N = 30)

Table 19

Summary of significant effects ($p < 0.05$) from four-way ANOVAS for repeated measures on cognitive variables

	Koskela					Orientation Test			
	OR	Mem.	P.A.	Conc.	Total	Time	Place	Person	Total
Between Group effects									
Main effects:									
Treatment (C)							05		
Place (P)		001		005	05	05	05	05	05
Degree of Dementia (D)	00	00	00	00	00	00	00	001	00
Interactions:									
C x P									
C x D									
P x D				05					
C x P x D			05	05					
Within Group effects									
Occasions (O)						05			05
O x C									
O x P				01					
O x D		05							
O x C x P						05			
O x C x D	05								
O x P x D									
O x C x P x D									

Table 20

Summary of significant effects ($p < 0.05$) from four-way ANOVAS for repeated measures on behavioural variables

	ADL	G.R.S. W/A	G.R.S. A/D	Total	Spatial Orientation	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	FT
						Ferm's Fields of Behaviour											
Between group effects																	
Main effects:																	
Treatment (C)																	
Place (P)					00												
Degree of dem. (D)					00												
Interactions:																	
C x P								05						05			
C x D																	
P x D																	
C x P x D																	
Within group effects																	
Occasions (O)			00														
O x C																	
O x P																	
O x D					05												
O x C x P					01												
O x C x D					05												
O x P x D																	
O x C x P x D																	

Table 21

Summary of significant effect ($p < 0.05$) from four-way ANOVAS for repeated measures on activity variables

	Social			Activity				Interaction				Active
	Pro	Non	Anti	Pass.	Act.	Total	Patients	Group	Staff	Other	Nobody	Posture
Between group effects												
Main effects:												
Treatment (C)	05								05		05	
Place (P)	005	005		000		00				05	05	05
Degree of dementia (D)												
Interactions:												
C x P												
C x D												
P x D												
C x P x D												
Within group effects												
Occasions (O)	05	05				05						
O x C				000		05						
O x P	05	05		000	005	005			05		05	
O x D												
O x C x P				05			05					
O x C x D												
O x P x D												
O x C x P x D												

Tables 19 to 21 summarize the significant effects derived from the four-way ANOVA on the cognitive, behavioural and activity variables respectively. It should be noted that because of zero subjects in one of the cells caused by missing data it was necessary to substitute three-way ANOVAS for analysis of the activity data from the Ward Social Behaviour and Activity Rating Scale, where the factors class and place were employed, with no grouping by degree of dementia. The complete set of ANOVA tables are presented in Appendix 10.

1. Cognitive Variables

A highly significant main between groups effect for degree of dementia is shown for all nine of the cognitive variables. Likewise a significant main between groups effect for place is evident for seven of the nine cognitive variables. This data indicates that in general the cognitive variables discriminate well between the subjects in the two degree of dementia groups and in the two residential locations. Significant second order between groups effects are only shown for two of the nine cognitive variables. One of the cognitive variables (place orientation) shows up a main between groups effect for treatment. Fortunately this variable does not show up any significant within group effects involving the treatment factor. Such effects formed the focus of further analysis of this data.

No variables showed a significant O x C effect. Time orientation showed a significant O x C x P effect and this was broken down by a further three-way ANOVA for the subsets of subjects in the two residential locations. Koskela orientation showed a significant O x C x D effect and this was broken down by a further three -way ANOVA for the subsets of subjects in the two degree of dementia groups. In addition the significance of the changes across occasions 1-2 and 2-3 were separately determined for time orientation and across 1-2 for Koskela orientation, which was not administered on occasion 3. The ANOVA tables for these analyses are presented in Appendix 11. Taking these variables in turn:

(i) Koskela Orientation. The mild dementia groups receiving class RO in both hospital and home show improved orientation as a result of this twelve week orientation programme. The mild control groups in both settings show deterioration in orientation and the overall treatment effect is significant ($p < 0.01$). In comparison the gravely demented group in both settings deteriorates slightly over this period irrespective of treatment allocation (p = NS). Figure 6 graphs these changes.

(ii) Time Orientation. Both the mild and the severe groups in the home improve time orientation with treatment over occasions 1-2, with the control groups in both settings showing some deterioration. The overall treatment effect is significant at $p < 0.05$. No significant changes are evident for the hospital group across this time period. Figure 7 graphs these changes. With treatment withdrawal (occasions 2-3) both the mild and severe groups in the home lose most of the gains established earlier and this relapse approaches significance ($p < 0.08$). For the hospital groups the changes are again non-significant across occasions 2-3.

2. Behavioural Variables

In contrast to the cognitive variables the behavioural variables show little in the way of main between group effects. None of the sixteen variables of the GRS and the Ferms Fields show main effects for either degree of dementia or place. However spatial orientation shows a main effect for both dementia and place. No second order between group effects are shown in the 17 behavioural variables. This data indicates that

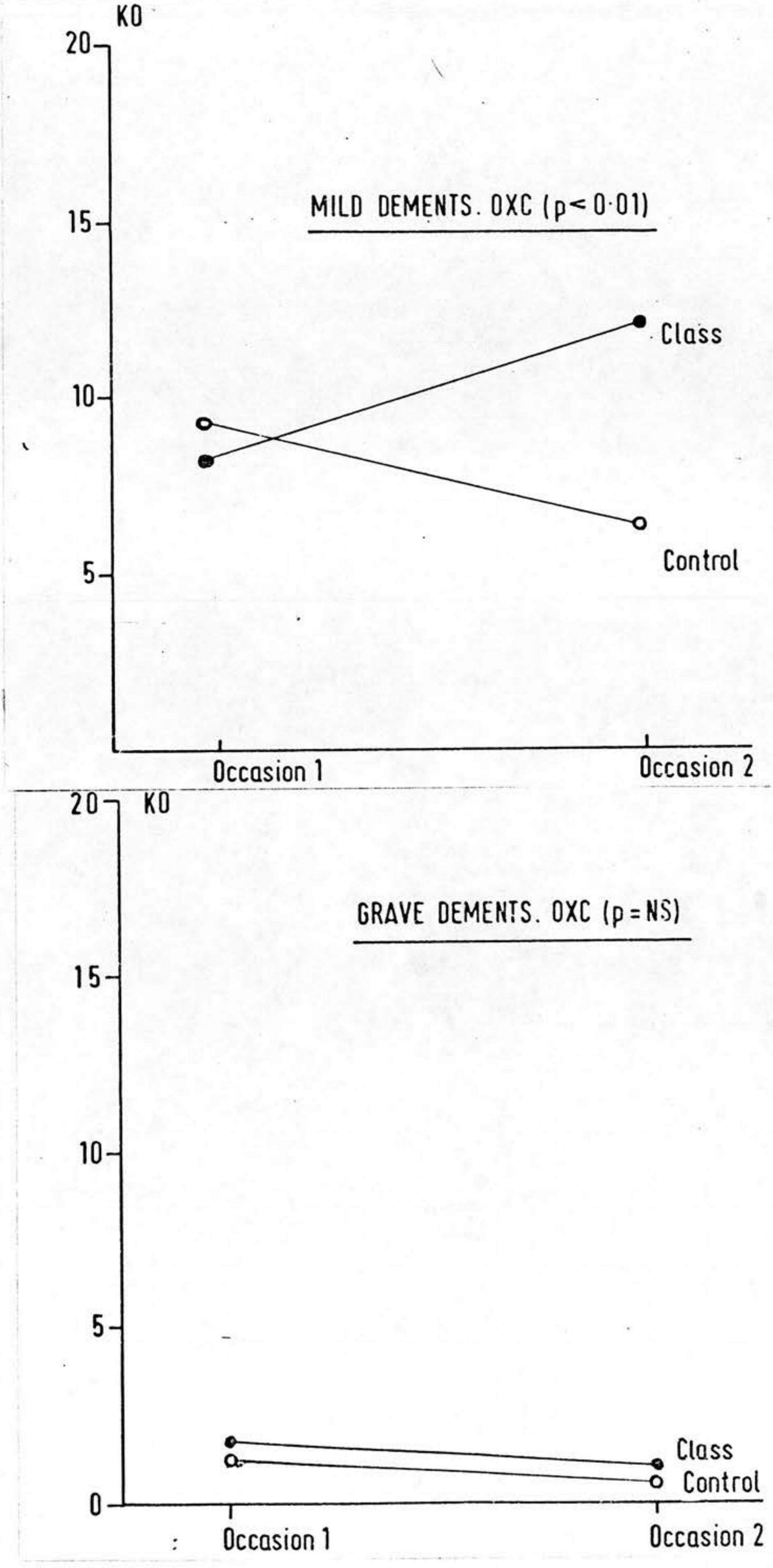
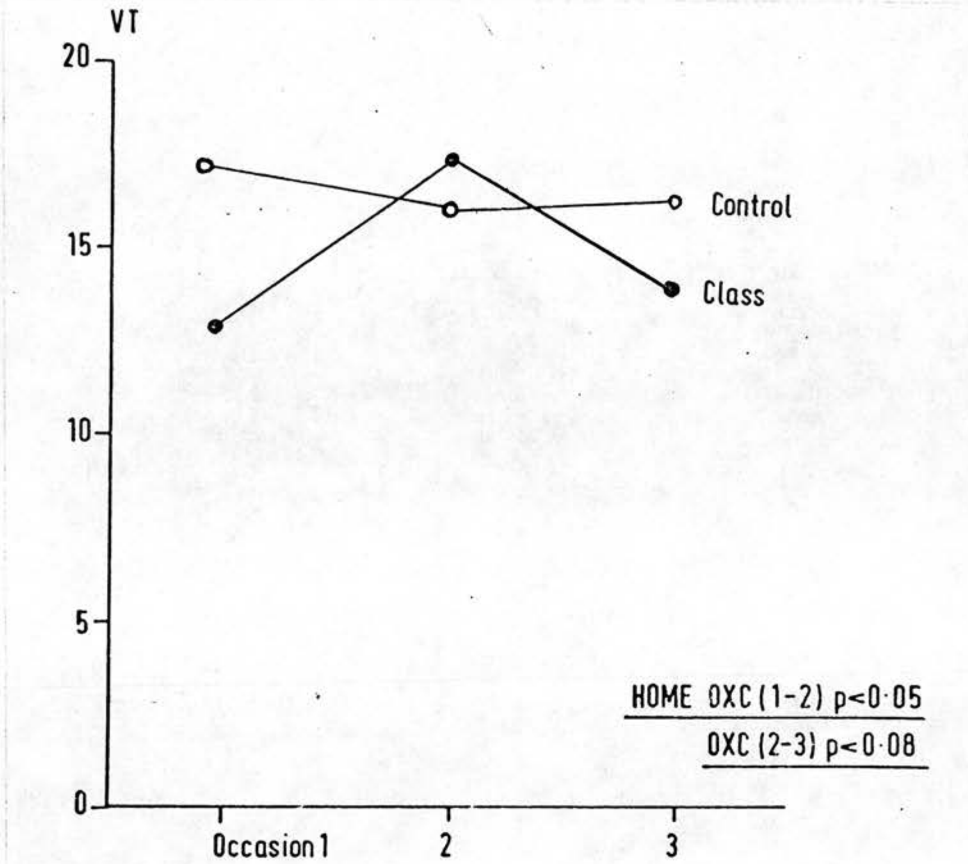


Fig. 6 Change in Koskela Orientation for mild and gravely demented class and control subjects across occasions 1 - 2.



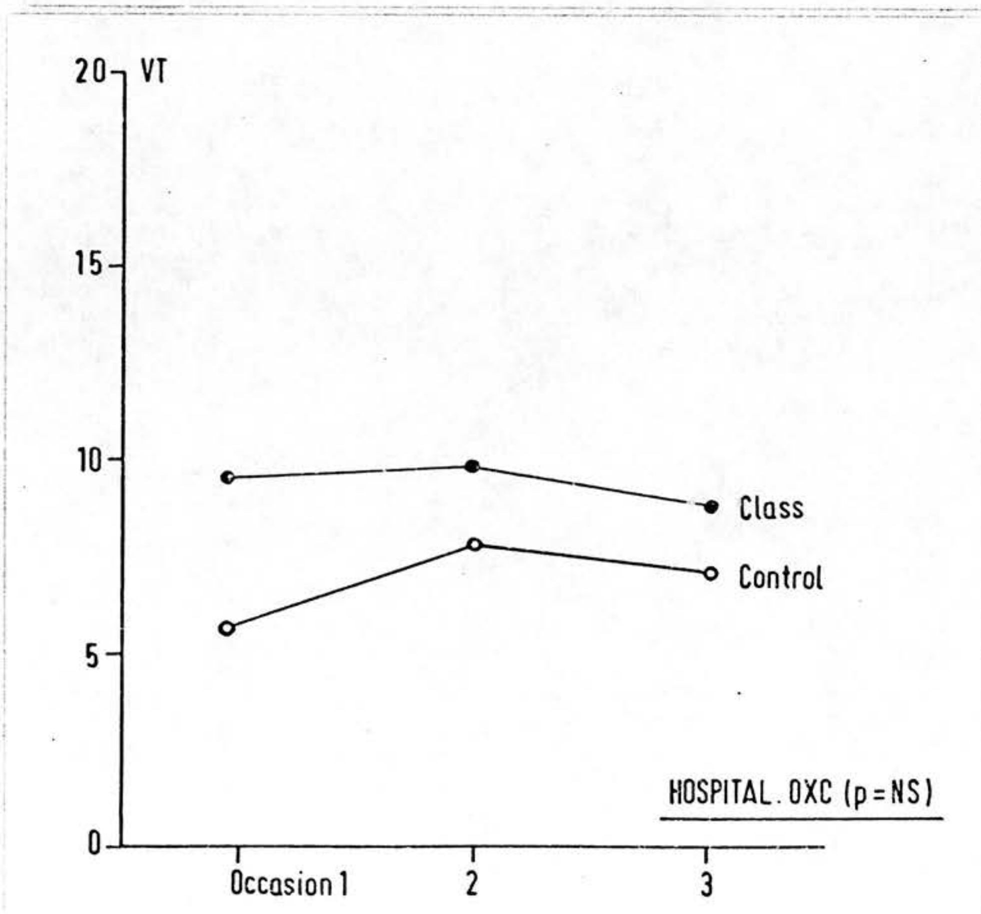


Fig. 7 Change in Time Orientation for class and control subjects in the home and hospital settings across occasions 1 - 3.

behaviourally the subjects in the two dementia groups and in the two residential settings are not clearly discriminated by the behavioural measures employed.

Spatial orientation shows both a significant O x C x P and O x C x D effect. This was broken down in the manner described for the cognitive variables of Koskela orientation and time orientation. None of the other behavioural variables show a significant effect for treatment.

Spatial Orientation. Across occasions 1-2 in both hospital and home there is no significant treatment effect on spatial orientation but across occasions 2-3 the gravely demented control group in the home deteriorate. This results in a significant O x C effect in favour of RO treatment ($p < 0.05$), a significant O x D effect ($p < 0.05$) in favour of the mild dementia group and a significant O x C x D effect ($p < 0.01$). The mildly demented control group in the hospital improve in spatial orientation across occasions 2-3 whereas the gravely demented treatment group deteriorate. This results in the hospital in a significant O x C effect ($p < 0.05$), this time in favour of the control group, and a significant O x D effect in favour of the mild dementia group. Thus it would appear that the treatment benefits subjects in the home but has the opposite effect in the hospital. In both settings the mildly demented group benefit more than the severely demented group. Figure 8 graphs these changes. Although non-significant the change across occasions 1-2 for the gravely demented group in both the hospital and the home indicates some improvement in this intensive phase of class RO treatment.

3. Activity Variables

Seven of the twelve activity variables show a main effect for place. Three (pro-social behaviour, interaction with staff and interaction with nobody) show a main between groups effect for treatment. However, none of the three show up any significant within group effects involving the

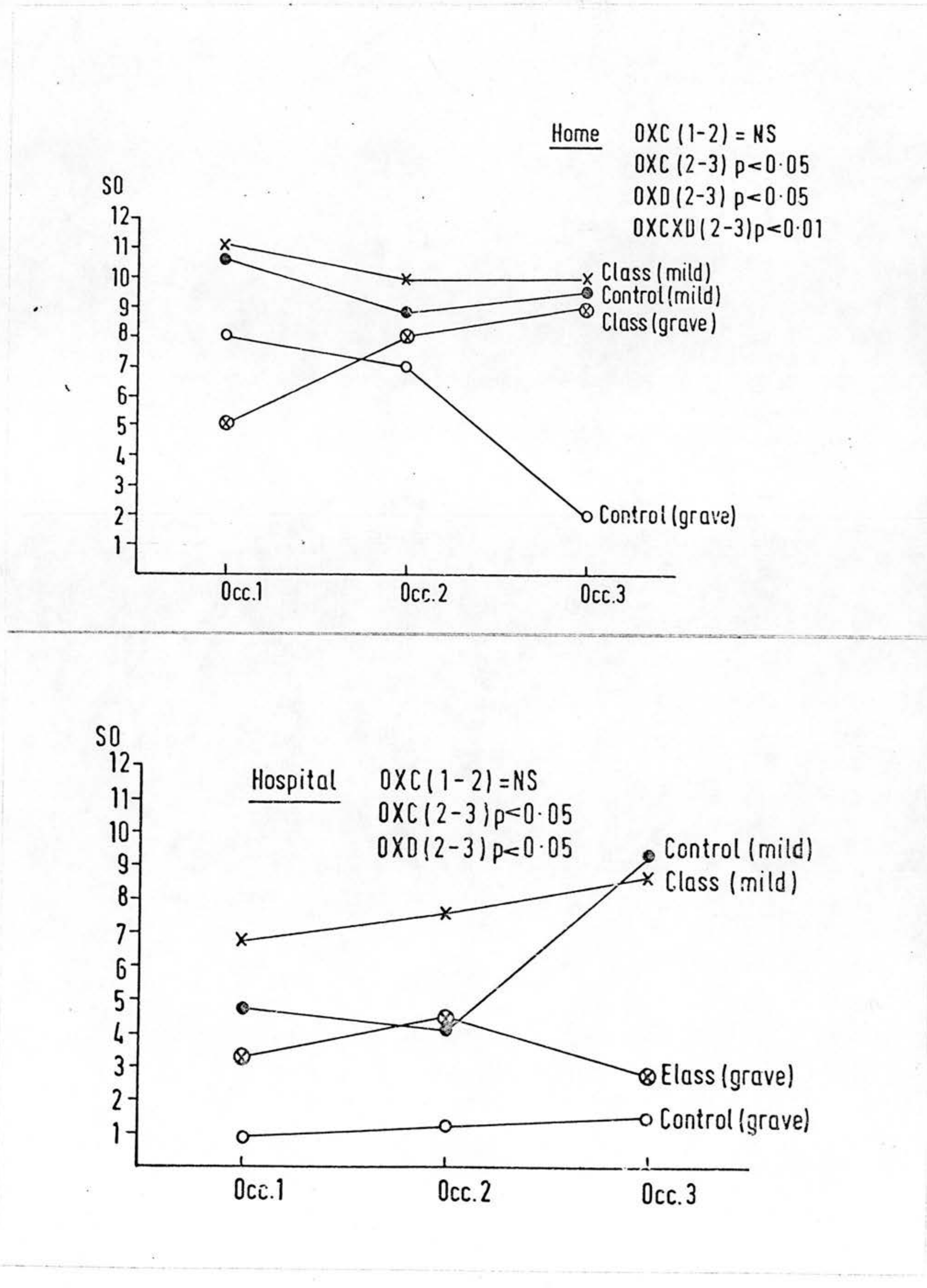


Fig. 8 Change in Spatial Orientation for mild and gravely demented class and control subjects in the home and hospital settings across occasions 1 - 3.

the treatment factor.

Significant O x C effects are evident on passive activity ($p < 0.0001$) and total activity ($p < 0.05$). Passive activity also shows a significant O x C x P effect ($p < 0.05$) and a similar effect is evident on interaction with patients ($p < 0.05$). These higher order interactions were broken down by further three-way ANOVAS for subjects in the two residential locations across occasions 1-2 and 2-3. These ANOVA tables are in Appendix 11 and the changes are graphed in Figures 9-12. Owing to missing data in one cell it was not possible to complete three-way breakdown ANOVAS for the smaller home sample.

(i) Passive activity. Across occasions 1-2 in the hospital there is a significant treatment effect. Both the mild and severely demented treatment groups show a sharp drop in passive activity ($p < 0.01$) in contrast to the control groups which stay even or improve. Across occasions 2-3, although the mild dementia treatment group improve somewhat, the O x C effect is not significant (Figure 9).

(ii) Interaction with other patients. A similar pattern of change to that occurring in Passive activity is evident. Across occasions 1-2, the intensive treatment phase, the treatment subjects of both mild and grave dementia groups in the hospital show a sharp fall in interaction with other patients ($p < 0.005$). Again, across 2-3 the mild dementia treatment subjects appear to improve but the treatment effect is non-significant (Figure 10).

(iii) Total activity. The significant O x C effect for Total activity appears to reflect a decrease in Total activity for the treatment group relative to the control group across occasions 1-2. Across occasions 2-3 the differences would again appear to be significant (Figure 11).

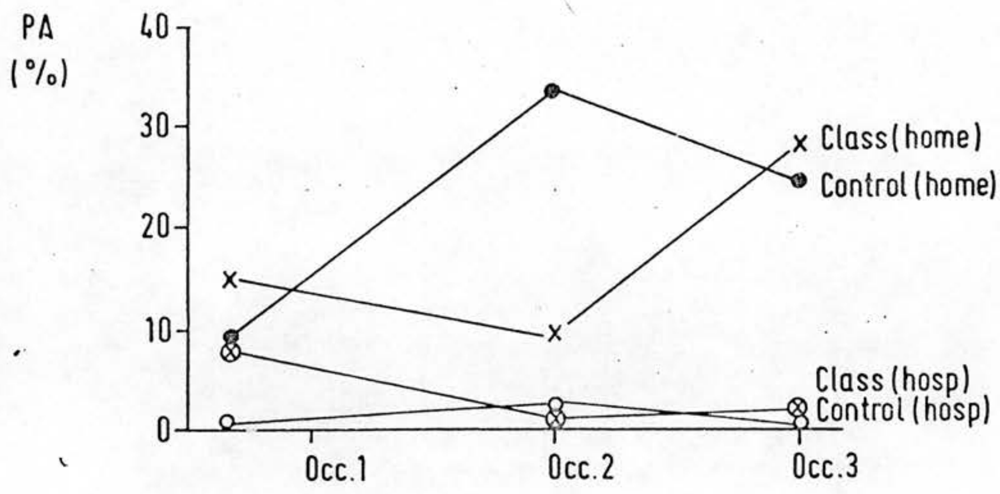


Fig. 9 Change in Passive Activity for class and control subjects in the home and hospital settings across occasions 1 - 3.

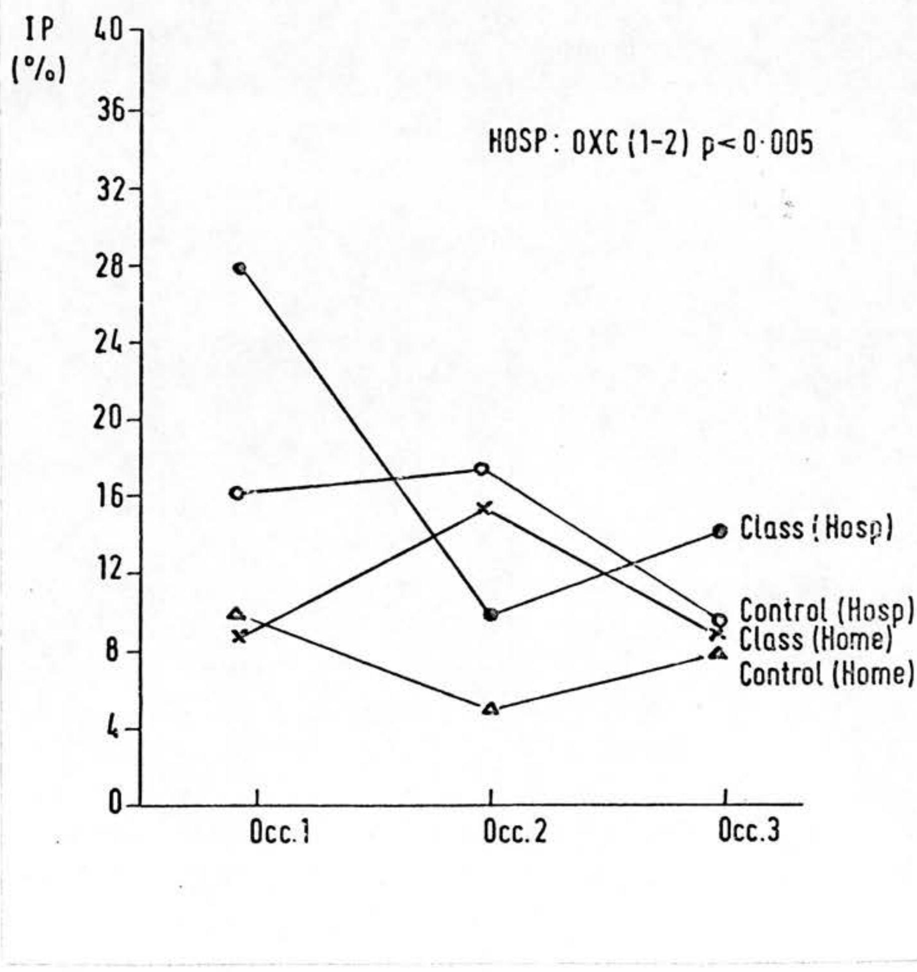


Fig. 10 Change in interaction with other patients for class and control subjects in home and hospital settings across occasions 1 - 3.

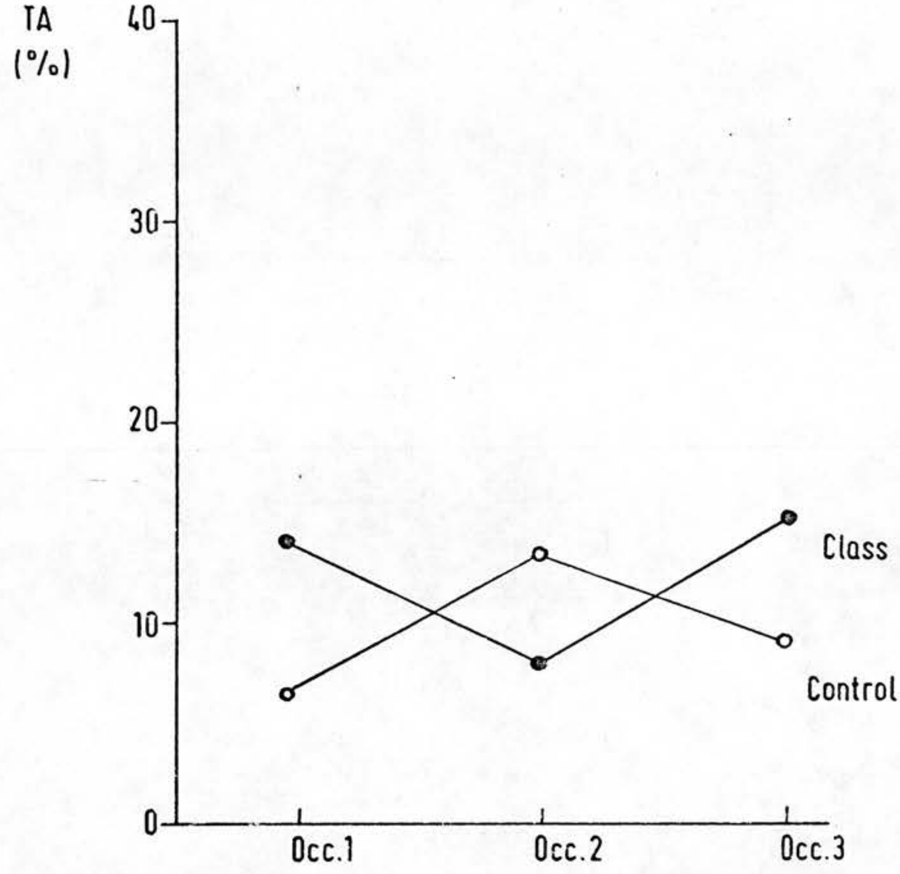


Fig. 11 Change in Total Activity for class and control subjects across occasions 1 - 3.

Discussion. These results demonstrate that class RO produces measurable improvement in the verbal orientation of dementia patients in the predicted direction. The changes are somewhat circumscribed, however, and dependent on interactions with degree of dementia and residential location. Clear support for Brook et al's (1975) contention that mild to moderately demented subjects benefit most from this procedure is demonstrated in the changes noted in the Koskela orientation test. This is not replicated however in the results for the more detailed Extended Orientation questionnaire where, of five variables, only time orientation improves with treatment and then only for subjects, both mild and gravely demented, resident in the home. Thus degree of dementia does not seem to influence improvement in time orientation and the treatment groups in the home seem to benefit more from the programme than their counterparts in the hospital.

This demonstration of greater change on the Koskela as opposed to the Extended Orientation test suggests that change was restricted to the more basic set of orientation items contained in the Koskela and not on the more varied set of items contained in the extended test. Indeed the items of the Koskela closely match the information most frequently rehearsed during class RO. Greene et al (1979) have demonstrated from a series of single case studies that improvement on orientation items tackled in treatment sessions may generalize to items not specifically covered in treatment. The results of the present experiment would appear not to support this contention.

Unlike Woods (1979) the present results do not indicate broader ranging cognitive changes in memory, learning and concentration as a result of class RO. Considering the time and effort expended in organizing and then providing class RO, this is far from encouraging.

In agreement with Citrin and Dixon (1977) and Woods (1979), who demonstrated improved cognitive performance but not behaviour change as a result of class RO, the present data shows no treatment effect on any of the sixteen behavioural variables contained in the GRS and the Ferms Fields of Behaviour. The lack of change on these behavioural variables is not however surprising as class RO was indeed originally designed as a supplementary procedure to 24 hour RO and it is the latter which is indicated as the means of producing behavioural as opposed to cognitive change. Some confusion has been evident in the literature on this point. Although the provision of orientation information is a feature of both class and 24 hour RO the inference should not be made that RO assumes behaviour change to be dependent on cognitive change. Rather, in 24 hour RO, orientation information provided by staff serves mainly to cue behaviour which the staff actively seek to prompt and encourage. This is done, not in a classroom setting, but while routine activities of daily living are being performed by subjects in the fashion described by Drummond et al (1978).

The demonstrated changes in spatial (behavioural) orientation with treatment are ambiguous and interact with both place and degree of dementia. The changes in passive activity, total activity and interaction with other patients suggest that as a result of class RO subjects decrease on these activity parameters when back in the general ward milieu. This finding is not in the expected direction and is difficult to explain.

When the change across occasions 2-3 (treatment withdrawal) is examined for the variables that show a significant treatment effect across 1-2 and are also measured on all three occasions vis time orientation, passive activity and interaction with other patients, a tendency for reversal is noted. Time orientation is not maintained and returns almost to the level evident at baseline. Passive activity and interaction with patients, reduced by treatment appear to reverse in a positive direction for the mildly demented subjects but the gravely demented continue to deteriorate. These few variables do not provide convincing evidence but it may be concluded that some support is evident for the hypothesis that changes with treatment, whether positive or negative, are not maintained after treatment is withdrawn. This agrees with numerous other reports indicating that deterioration occurs if psychosocial interventions for the mentally impaired elderly are withdrawn. As mentioned earlier, RO is not designed as a limited intervention programme and therefore it makes sense to investigate its impact over a longer continuous term of application.

It may be concluded that over the short term class RO treatment does bring about improvements in verbal orientation for dementing subjects who are in the mild and moderate range of mental impairment. Very severely demented subjects do not appear to benefit. As an agent of behaviour change, or broader ranging cognitive change, however, class RO seems ineffective. Indeed it would appear that regular class RO inhibits levels of activity and patient to patient interaction in general daily routine. The cost effectiveness of short term class RO, as measured by the change in subject's cognitive performance and behaviour does not seem high. In its favour class RO is enjoyed by the subjects participating and appeared to serve a useful training role for staff in the lead-up to the 24 hour experimental programme described in later chapters. Moreover its overall effectiveness as an agent of change in patients might be more faily tested in a longer trial - the subject of the experiment to follow.

CHAPTER 8: EXPERIMENT 2

An Evaluation of the Longer Term Effects of Implementing a Programme of Classroom RO with Dementing Subjects

Introduction

Like the earlier studies summarized in Table 11, Experiment 1, just described, evaluated class RO applied over a relatively short time span. It might be hypothesized, however, that due to the progressive nature of the cognitive changes evident in dementia and the resulting therapeutic goal of ameliorating or slowing down, rather than reversing, these changes that the best test of class RO might be to apply and evaluate it over a considerably longer period.

Typically patients with dementia survive for several years in residential care and so the true effectiveness of any management or treatment approach should be determined over as long a period as possible. As Woods (1981) has suggested, a successful approach is not solely one in which patients improve but one in which deterioration is slowed so that patients spend a greater length of time in the phase of mild-moderate impairment and less in the later phase of severe impairment and almost total helplessness and indignity.

The aim of this second experiment then is to test the effects of class RO applied over a period of one year and to determine if degree of dementia, a significant factor in the orientation change demonstrated in the first experiment, effects outcome.

Method

Subjects. Forty subject, thirty in the hospital and ten in the home were selected from the sample of sixty employed in the first experiment. The twenty subjects excluded had received 24 hour RO at some point during the year and therefore could not be maintained in the sample for a test of class RO alone. Of the twenty excluded, ten had received class RO in addition to the 24 RO and ten had received no class RO. Thus the remaining sample of forty contained equal numbers in the experimental class RO and control conditions. Moreover, the balance matching procedure adopted in the selection of these twenty subjects for 24 RO ensured that the remaining forty subjects remained matched, experimental vs. control, in the fashion described for the total sample of sixty in Experiment 1. The reader may satisfy himself as to the exact nature of this procedure by referring to the Method section of Experiment 4.

Design. Following the withdrawal of class RO between weeks 12 and 24, as described in the first experiment, class RO was reintroduced four times weekly for the same experimental subjects between weeks 24-48. All subjects were assessed at the end of this period on all the measures already described. Thus over the total period of this second experiment the experimental group received class RO for a total of 42 out of the 48 weeks. Of the 42 weeks 36 were weeks in which RO was provided four times and 6 were weeks in which RO was provided only twice. The control group received no class RO at any time. The class RO treatment procedure adopted was the same as in the first experiment.

Results

Three-way ANOVA for treatment and degree of dementia were used to compare pre-test (week 0) with post-test (week 48) for each measurement variable. These results are summarized in Tables 22-24 and the ANOVA tables are presented in Appendix 12.

A highly significant main between group effect for dementia is again evident on all nine of the cognitive variables./

Table 22

Summary of significant effects ($p < 0.05$) from three-way ANOVAS for repeated measures on cognitive variables

		Koskela				Extended Orientation			
	OR	Mem.	P.A.	Conc.	Total	Time	Place	Person	Total
Between group effects									
Main effects:									
Treatment (C)									
Degree of dementia (D)	00	00	005	005	00	005	01	005	005
Interactions:									
C x D									
Within group effects									
Occasions (O)									
O x C									
O x D									
O x C x D									

Table 23

Summary of significant effects ($p < 0.05$) from three-way ANOVAS for repeated measures on behavioural variables

	G.R.S.				Ferms Fields											
	ADL	W/A	A/D	Total	1	2	3	4	5	6	7	8	9	10	11	Total
Between group effects																
Main effects:																
Treatment (C)																
Degree of dementia (D)	05			05		05	005	05	05	01	001	00	05	05	05	005
Interactions:																
C x D																
Within groups effects																
Occasions (O)	05	005		01		05						05				
O x C															05	
O x D										05						
O x C x D																

Table 24

Summary of significant effects ($p < 0.05$) from three-way ANOVAS for repeated measures on activity variables

	Social			Activity			Interactions					Active
	Pro-	Non	Anti	Pass.	Act.	Total	Patients	Group	Staff	Other	Nobody	Posture
Between group effects												
Main effects:												
Treatment (C)												
Degree of dementia (D)									01	05		05
Interactions:												
C x D												
Within group effects												
Occasions (O)	01	005								05		
O x C												
O x D												
O x C x D												

On the behavioural variables a main between groups effect for dementia is evident on thirteen of the sixteen. This is in contrast to the first experiment where none were significant and indicates that after one year but not at six months the behavioural variables of the GRS and Ferms Fields discriminate well between the mild and severe dementia groups. Main within groups occasions effects are absent for all the cognitive variables but present for several of the behavioural variables.

Only one significant second order within groups effect for treatment is evident. The rating for "hobbies" on the Ferm's Fields indicates a significant increase ($p < 0.02$) in hobby activity as a result of class treatment for both mildly and severely demented subjects. This change is graphed in Figure 13.

Discussion

These results are more disappointing than those for the shorter term evaluation of class RO. Apart from the isolated improvement in hobby activity by the treatment group it would appear that no other measurable benefit accrued from one year and approximately 156 sessions of class RO! The hypothesis that the benefits of class RO may accumulate more, the longer the treatment is conducted, is firmly refuted. Indeed it would appear that the most benefit accrues in the short term so that temporarily the treatment groupsgain on their matched controls. It might be speculated that the true progressive nature of the basic disease process then re-establishes itself and after a longer period the experimental and control groups are indistinguishable.

It must be concluded that class RO by itself is not an effective therapeutic strategy for the cognitive and behavioural deficits evident in dementia.

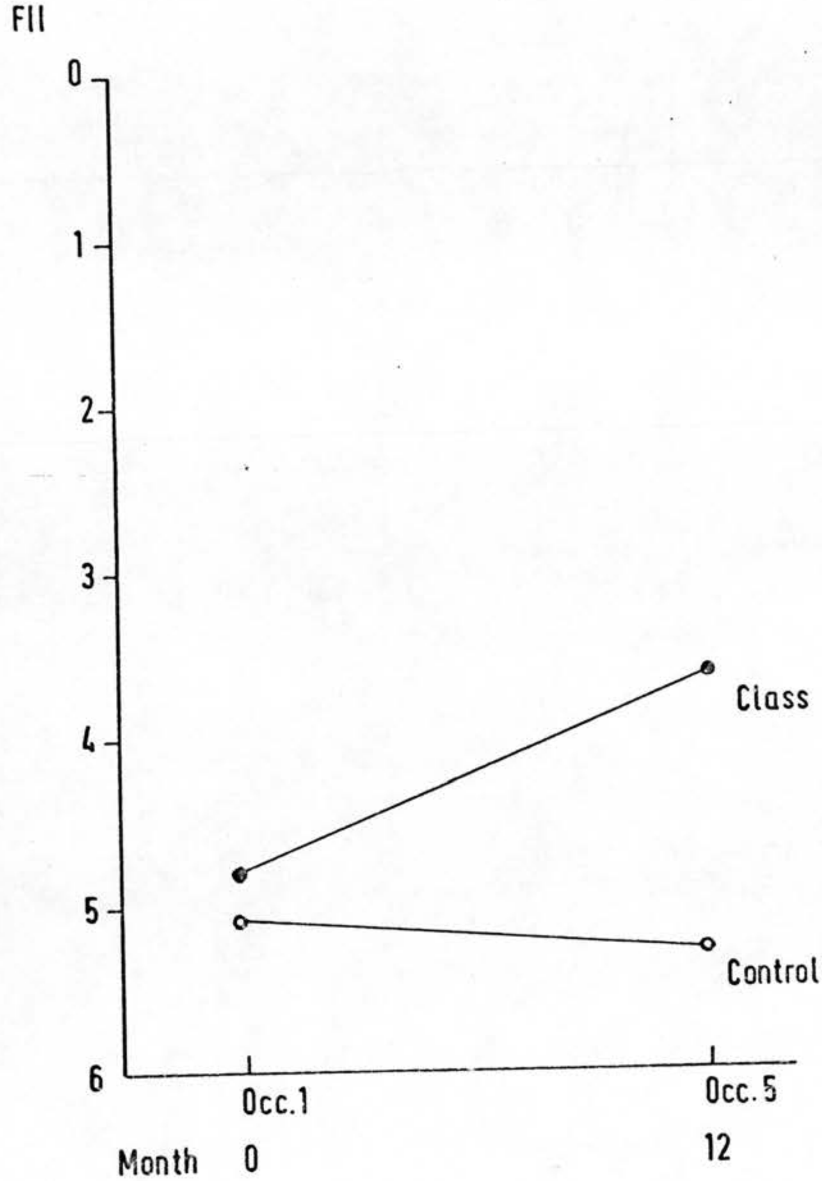


Fig. 13 Change in rated Hobby activity for class and control subjects across occasions 1 - 5.

CHAPTER 9: EXPERIMENT 3.

An Evaluation of Two Components of Twenty-four Hour Reality Orientation (24 RO)

Introduction

In contrast to the class RO approach which is both circumscribed to a specific place at a specific time and which utilizes a primarily verbal strategy to teach orientation information, the 24 RO approach involves the active on-ward re-orientation of the dementing patient by all staff on all occasions that they interact with the patient during routine daily living activities and at other times. The main procedures involved in this reorientation by the total staff group are (a) the provision of verbal information on time, place and person; (b) the consistent correction of confused speech and behaviour; (c) the prompting of adaptive behaviours, allowance of time for patient response and the provision of primarily social reinforcement; and (d) the reorganisation of the environment to provide prosthetic orientation aids such as clocks, calendars, signposts and noticeboards. Whereas class RO is primarily a cognitive retraining strategy, 24 RO has both cognitive and behavioural components.

Later in this thesis two experiments are presented which evaluate the effectiveness of the 24 RO approach in toto. The present experiment is from both the semantic and practical perspectives, a bridge between the earlier experiments on class RO and the ones to follow on 24 RO. Several interrelated points help explain the rationale: (1) studies to date have failed to adequately demonstrate behavioural as opposed to cognitive change as a result of class RO. Perhaps therefore an emphasis on orienting patients at a non-verbal level may produce a greater pay-off, and (2) there have been no studies to date which have evaluated 24 RO separately from class RO. For the studies in which 24 RO and class RO were evaluated in combination the results for behaviour change are disappointing (Citrin & Dixon, 1977; Harris & Ivory, 1976). Aside from the obvious possibility that 24 RO may be an ineffective strategy for producing behaviour change in dementia, these results may be alternatively viewed as due to 24 RO being somewhat difficult to implement effectively and then evaluate. Perhaps the staff approach to the management of dementing patients does not change significantly as a result of 24 RO implementation. The patients would not then "get the 24 RO pill". Alternatively staff behaviour might change but be highly inconsistent and variable. Some behavioural deficits might be tackled and others left unattended. Such potential problems are difficult to predict and control for. Therefore it is worthwhile to approach the evaluation of 24 RO procedures systematically from a position where the treatment strategy is exactly defined both in terms of its content and frequency of presentation and where the target behaviour(s) are also specific. This is the existing state of affairs for all class RO evaluations and is the modus operandi of all behavioural research; and (3) Aside from the behavioural expectations inherent in 24 RO it might be argued that class RO and 24 RO are not that different in practice and that the description "24 RO" gives a false impression of intensity and consistency. Care staff in residential settings for the dementing elderly do not spend more than a fraction of the 24 hour period interacting with any one elderly person. During the most part of a 24 hour period the only aids to orientation are those provided in the environment. It would therefore be worth testing the relative effectiveness of the staff-patient orientation training approach intermittent as it is vs. the provision of orientation aids.

The present experiment aims to evaluate the effectiveness of two clearly prescribed components of 24 RO in the amelioration of one specific behaviour deficit in dementia. Ward (spatial) disorientation, i.e., an inability to locate prominent features in the environment such as bedroom, bathroom, etc., was chosen as the target behaviour. Not only is this behavioural disability directly related to orientation but it has a direct implication for a range of other behaviours, e.g., continence. It is also easily and directly measurable and attempts to provide reorientation training can be carefully controlled. The two prescribed 24 RO components evaluated both separately and in combination are (a) a staff-patient training procedure utilizing the basic principles of 24 RO with the exception of orientation aids; and (b) the provision of prosthetic orientation aids in the form of signposts.

From a practical perspective it was necessary to conduct the test of the training procedure alone before orientation aids were provided as a feature of the main 24 RO programme. The first part of this experiment was therefore conducted in parallel with the class RO evaluation already described in the first experiment. The second part of this experiment was conducted at the time of the introduction of 24 RO. Thus, as mentioned already, this experiment forms a bridge between the two in practice as well as from a developmental research perspective.

Method

Subjects and Setting. Eight subjects from the class RO experimental group of 20 in the hospital wereselected on the basis of poor spatial orientation as measured at the pretest described for the first experiment. Four were selected from each of the two almost physically identical wards. Care was taken to select patients with no gross deficits in vision, speech or hearing. The ward environments contained no signposts, colour coded areas or other obvious locational cues. The lay-out of the ward is illustrated in Figure 14. The basic design is one of an extended corridor with a main entry door at one end. All the functionally distinct areas of the ward were adjacent to this central corridor. Eight areas, namely, sitting room, bedroom, bed, bathroom, front door, dining room, kitchen and T.V. area were selected and arranged in a fixed route to serve as a measure of ward orientation.

Measurement. Starting from a fixed point in the corridor adjacent to the sitting area subjects were individually asked to locate each area in turn. Responses were scored 2, 1, 0 according to whether a correct identification was made without assistance, with the aid of a predetermined clue presented if identification could not be made independently, or failed to make the correct identification after being provided with the clue. The test route was negotiated twice on each trial allowing a possible maximum score of 32.

Design and Procedure. Two separate studies were conducted:

Experiment 3a. Six of the eight subjects were selected at random and employed in an ABABA single case design (Hersen & Barlow, 1976) to test the effectiveness of an active ward orientation training procedure alone. During baseline ward orientation was measured as described above with no correction or training given for incorrect responses. During treatment phases subjects were given orientation training. This involved each incorrectly identified area being shown to the subject, verbally described by the trainer and then the subject coached to repeat the name of the area. Three of the eight areas were not trained and served as a test of generalisation. The details of this testing and training procedure are shown in Figure 15.

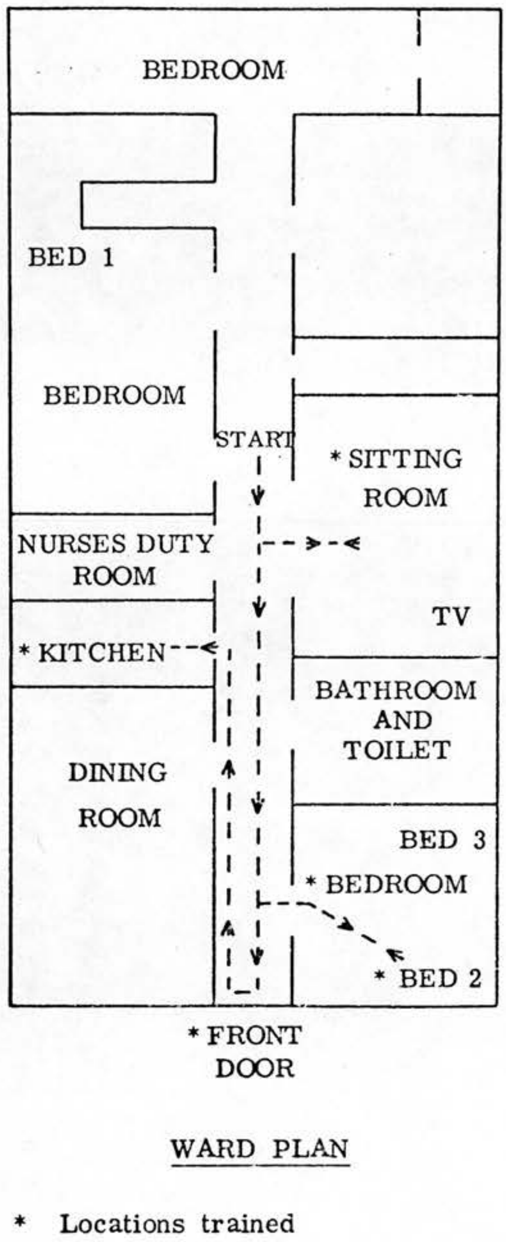


Fig. 14 Plan of the two hospital wards used in ward orientation training.

1. INTRODUCE SELF, MOVE TO STARTING POINT AND ASK PATIENT TO IDENTIFY FIRST LOCATION.

2. PRESENT A PRE-ARRANGED VERBAL CLUE IF PATIENT:

   (a) MOVES IN WRONG DIRECTION

   (b) MAKES AN INCORRECT IDENTIFICATION

   (c) FAILS TO MOVE

3. RECORD PATIENT MOVEMENT AND ASK FOR NEXT LOCATION FROM A POINT ADJACENT TO PREVIOUS LOCATION.

4. (a) IF BASELINE, SIGNPOST OR FOLLOW-UP PHASE - ACKNOWLEDGE CORRECT RESPONSES BUT PROVIDE NO CORRECTION FOR INCORRECT RESPONSES

   (b) IF WARD TRAINING PHASE - ACKNOWLEDGE CORRECT RESPONSES AND DIRECTLY TRAIN INCORRECT RESPONSE - DEMONSTRATE, VERBALLY DESCRIBE. ASK PATIENT TO NAME.

5. SCORE 2 FOR CORRECT RESPONSE (UNAIDED) AND 1 FOR CORRECT RESPONSE (WITH CLUE)

6. COMPLETE ROUTE TWICE.

Figure 15. Testing and Training Procedure.

In order to control the number and content of trials this testing and training was provided not by ward staff but by an independent trainer in the form of a postgraduate psychology student. Ward staff were not informed of the details. The ABABA phases of this experiment occurred between weeks 3-9 of the twelve week class RO phase of Experiment 1. A further follow-up was conducted immediately prior to the introduction of 24 RO, i.e., some four months after the second (b) phase of ward orientation training.

Experiment 3b. After the follow-up to 3a large three-dimensional ward signs labelling different areas were introduced to the wards and an ABC single case design used to test their effectiveness with or without ward orientation training. Of the six subjects employed in 3a one had dropped out due to illness and one had failed to respond to the ward orientation training procedure. The four 'responders' from 3a were used in 3b together with the two naive subjects selected but not employed at the start of 3a. The four 'responders' were randomly assigned to two conditions (1) ward orientation training in the two weeks prior to the introduction of signs; and (2) ward orientation training in two weeks after the signs had been introduced. The two new subjects were assigned to a no training condition. Thus three conditions were tested, signs alone, signs with a preceding training and signs plus training combined. Training in this second experiment was to all eight ward areas and was identical to the first experiment except that during the training that accompanied the introduction of signs, reference was naturally made to the signs.

Results: Experiment 3a. The data for the first experiment is shown in Figure 16. A clear treatment effect is evident for four of the five subjects on the five areas trained. The results for subject 5 (P5) are equivocal. A cumulative effect is evident with scores (maximum 20) higher on the second week than on the first week of the first treatment phase. For three subjects scores are higher on the second treatment phase than during the second week of the first treatment phase. Reversal effects are seen during return to baseline and on follow-up. Some maintenance is evident at two week follow-up but scores have returned to baseline levels or lower after four months. Some generalization of treatment effect to untrained ward areas seems to have occurred. However, given the narrower scoring band (maximum 12) this interpretation is debatable.

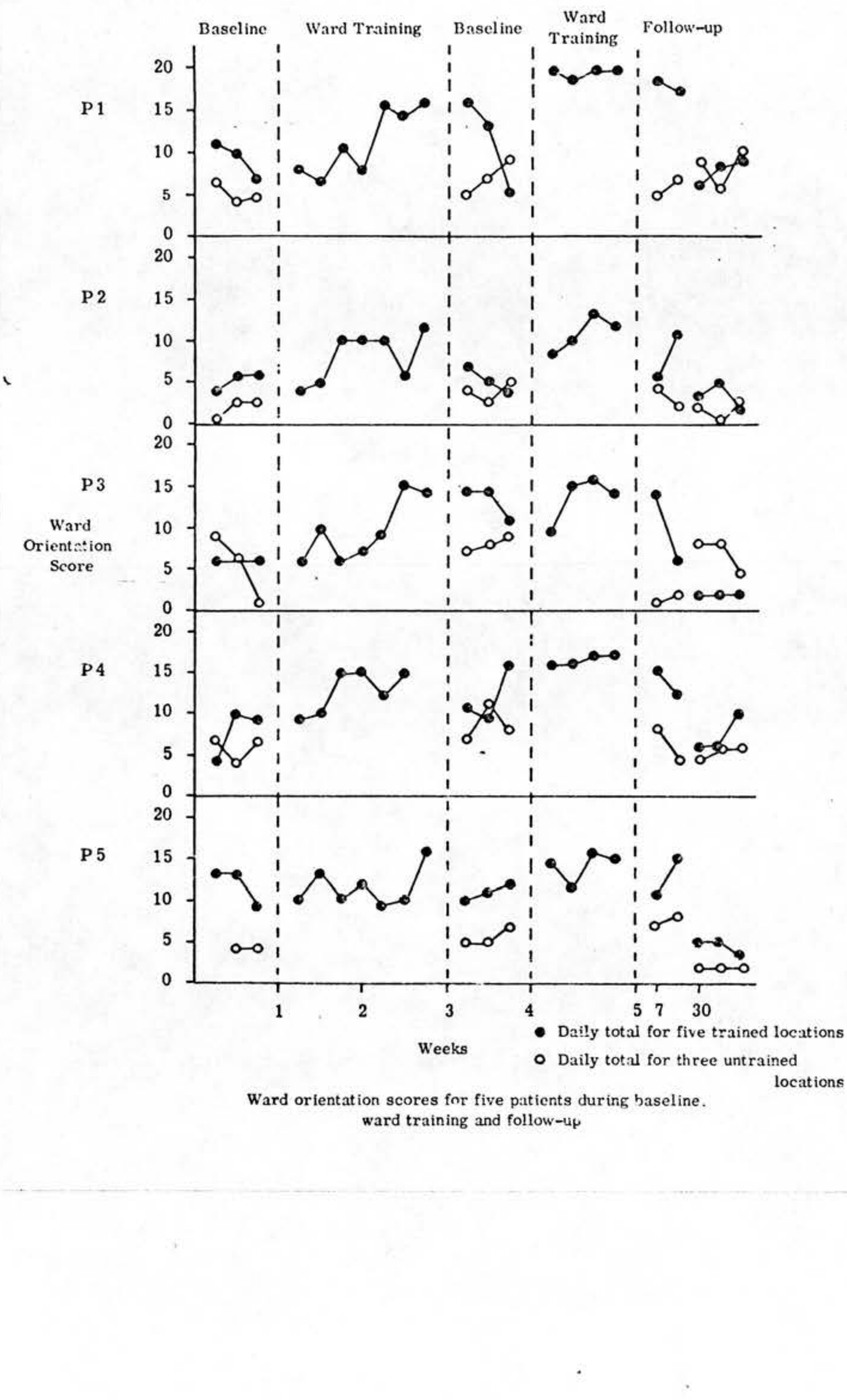


Fig. 16 Ward orientation scores for five patients during baseline, ward training and follow-up.

When the direction of change in score from trial 1 to trial 2 was examined each day during both treatment phases for each subject it was found that $T_1 > T_2 = 15$, $T_2 > T_1 = 16$, and $T_1 = T_2 = 22$. This suggests considerable consistency in level of ward orientation on the days involved and little in the way of a 'warm-up' or learning effect across trials on the training days.

A further analysis was completed to test the effect of ward orientation training. The five subjects above were matched post hoc for degree of dementia with five subjects receiving class RO only over the same period and with five control subjects. This matching was blinded. Scores for total verbal orientation on the Extended Orientation Test and the Ward Orientation Test of the first experiment at weeks 0 and 12 were then extracted for these fifteen subjects. The three groups: ward orientation training plus class RO, class RO alone and no treatment, each of N = 5, were then compared using the Wilcoxon test for related samples. A not quite significant improvement in ward orientation, assessed quite independently during Experiment 1, was evident for the group which received the ward training procedure. All other changes were non-significant. This data is presented in Table 25 and graphed in Figure 17.

<u>Results: Experiment 3b</u>. The data for the second experiment is shown in Figure 18 for the six subjects. Subjects P1-P4 are the four responders of the first experiment allocated to the two training conditions and subjects P6-P7 are the two new subjects allocated to the signs only condition. Data is presented only for the six areas that were signposted (maximum score 24) as front door and T.V. were excluded from this procedure.

Table 25

Verbal orientation and Ward orientation before and after three treatment conditions:

T 1: Ward orientation plus class RO
T 2: Class RO alone
T 3: No treatment control

		(Degree of Dementia)	Verbal Before	Verbal After	Ward Before	Ward After
T1	S1	(5)	32	31	4	8
	S2	(6)	18	21	6	12
	S3	(8)	32	32	6	6
	S4	(9)	33	27	4	8
	S5	(7)	15	16	2	4
	U	(7)	26	26	4.4	7.6
T2	S6	(3)	33	41	0	0
	S7	(5)	40	40	12	10
	S8	(7)	26	23	2	4
	S9	(8)	16	25	4	0
	S10	(9)			4	4
	U	(6.5)	29	32	4.4	3.6
T3	S11	(5)	26	22	8	0
	S12	(7)	20	20	2	0
	S13	(7)	25	25	2	5
	S14	(8)	20	15	2	4
	S15	(8)	25	25	2	0
	U	(7)	23	21	3.2	2.0

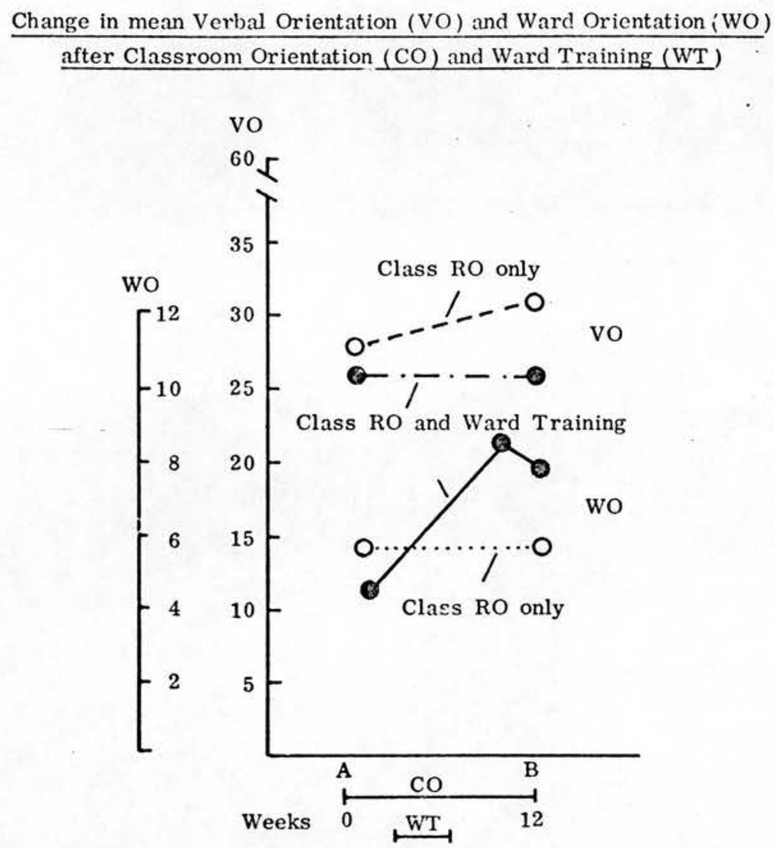


Fig. 17 Change in mean Verbal Orientation (VO) and Ward Orientation (WO) after Class RO alone and Class RO plus ward training.

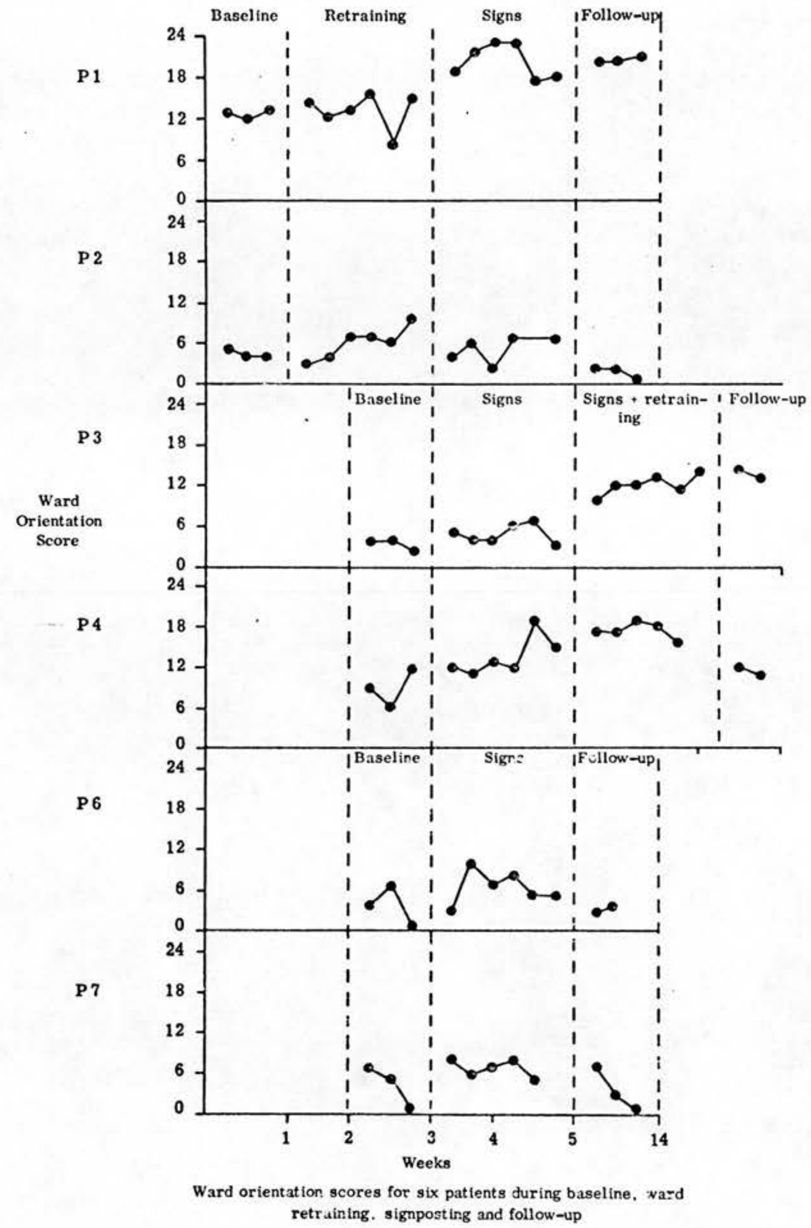


Fig. 18 Ward orientation scores for six patients during baseline, ward retraining, signposting and follow-up.

The response to retraining is less than was evident during the training phase of the first experiment. Scores for P2 improve a little but this gain was not maintained by signposts. On the other hand P1 failed to respond to retraining but ward orientation improved dramatically with the introduction of signposts. This gain was maintained at three month follow-up.

Orientation scores for one of the two subjects retrained after signs were introduced (P4) improved with signs and again with signs and retraining. The other (P3) responded only to signs and retraining combined and maintained these gains at follow-up. The two subjects, P6 and P7, in the signs only condition show, if anything, only minimal improvements in ward orientation with the introduction of signposts.

Signposts alone then do not seem to be generally effective in facilitating improvement in ward orientation. However, in combination with a preceding ward orientation training or more especially an accompanying ward orientation training, improvements are effected, which for two of the four subjects involved, are maintained fully at three month follow-up.

An attempt was made to replicate these findings with two spatially disorientated residents from the old people's home setting. In an effort to increase the potency of signposting larger and more easily noticed pictorial signs were employed alone or in conjunction with a training procedure identical to that described above. Difficulty was experienced in selecting suitable subjects as few residents in the experimental 24 RO section at the home evidenced severe ward disorientation. The two residents selected, although of degree of dementia 4 and 6 respectively, showed less ward disorientation than was evident for the subjects in the hospital. Thus there was less room for improvement as a result of experimental intervention.

With signs alone neither subject showed an improvement in the number of areas correctly identified (maximum 10), although on an additional measure of the time taken to make identification, correct identification appeared to be made more quickly. Following a ward orientation training with the signs still present both subjects improved to maximum score. These results are graphed in Figure 19.

Discussion

The results of 3a provide a clear demonstration that a specific behaviourally based ward orientation training is an effective treatment for ward (spatial) disorientation in dementia. The change in ward orientation is quite dramatic in some cases and overshadows the relatively minor improvements in verbal orientation obtained with class RO in the first two experiments. The group comparisons of ward training plus class RO vs. class RO only vs. no treatment do not, when taken alone, rule out the possibility of an interaction effect between ward training and class RO. However the phase changes in the ABABA single case data suggest clearly the presence of an independent effect for the ward training procedure. The finding that some improvement was maintained some five weeks after treatment withdrawal is quite impressive for such clearly dementing patients.

The relatively small amount of training required to improve ward orientation in the first instance, about 6-7 half hour sessions per subject, suggests that ongoing training of ward orientation during routine contacts of staff with patients may be enough to maintain gains indefinitely. This is the spaced practice methodology of 24 RO which contrasts somewhat with the training procedure adopted in this study where the practice was both spaced and massed. It may well be that the

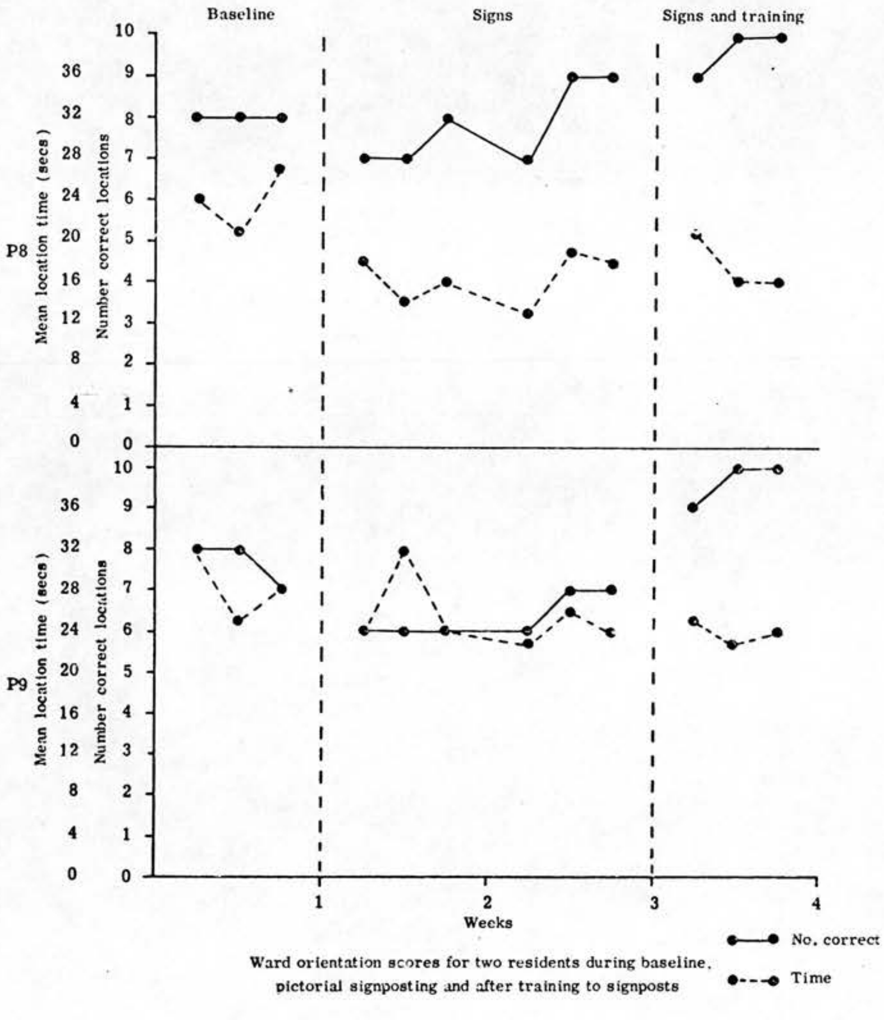


Fig. 19 Ward orientation scores for two residents during baseline, pictorial signposting and after training to signposts.

spacing and intensity of specific orientation proceduresare important variables in determining their effectiveness and it cannot be assumed from the results of this study that improvements would be evident in ward orientation as a result of general 24 RO procedures where the training procedure would probably be much more spaced.

It is interesting to note that when the data for the four responders (P1-P4) on 3a is compared, P3 and P4 with very severe degrees of dementia of 8 and 9 respectively show similar degrees of improvement with treatment to P1 and P2 who have more moderate dementia of degrees 6 and 5 respectively. This finding cannot be readily generalized from such a small number of cases but it does contrast clearly with the finding of the first experiment that mildly but not severely demented subjects benefitted from class RO by showing improvement in total Koskela verbal orientation. Brook et al (1975) and Greene et al (1979) likewise suggest that the mildly demented benefit most from class RO.

The results of 3b cast some doubt on the effectiveness of orientation aids used alone without specific orientation training. The utility of orientation aids seems to be in the maintenance of the behavioural improvement brought about by the specific training procedure. Thus in 24 RO it might be formulated that success depends on the degree to which staff modify their interaction strategies with the dementing patient in line with the principles of information provision, correction of confused behaviour and prompting of adaptive responses. As these interactions will necessarily be infrequent the provision of orientation aids may well be useful in maintaining gains throughout the 24 hour period. The nature of staff-patient communication has been shown to be important in the study of Woods (1979). In a study of class RO staff attention of a 'non-orientating' taype was shown to be considerably less effective than attention of an 'orientating' type in effecting cognitive improvement.

The results of 3a and 3b unfortunately do not indicate whether or not the subjects could adaptively use the acquired learning by, for example, finding ward locations along different routes from different starting points. It would also be interesting to know if improved ward orientation has a generalized effect on a range of other behaviours and activities of daily living such as incontinence and independent movement to meals, etc. Certainly it might be predicted that such generalization could well be dependent on staff encouraging and reinforcing such behaviour. The value of prompting procedures in facilitating behavioural engagement has been clearly demonstrated by McClannaghan and Risley (1975) and Blackman et al (1976).

In summary then this third experiment has demonstrated discrete behaviour change as a result of procedures analogous to 24 RO. These behaviour gains, when measured cost effectively in terms of the amount of training required, appear to be much greater than those achieved through class RO. In contrast to class RO the potential clinical significance of specific orientation training procedures is apparent.

CHAPTER 10: EXPERIMENT 4

An Evaluation of the Short Term Effects of Implementing a Programme of Twenty-four Hour RO with or without Class RO

Introduction

No study to date has evaluated the effects of 24 RO alone using the methodology of the controlled experiment. Letcher et al (1974), reporting retrospectively on the effects of a five year old RO programme with both 24 and class components, used the dubious criteria of hospital nursing levels to suggest that as a result of RO many patients in a geriatric institution were promoted to less dependent nursing levels. Both Harris and Ivory (1976) and Citrin and Dixon (1977) exployed a more exact experimental method but failed to separate 24 RO from class RO. Neither study demonstrated behavioural improvements in the patients' treatment but both report improved orientation levels. The former study population contained few cases of definite dementia as the majority of patients reported were long stay psychiatric patients grown old.

The present study aims to (1) test the effects of 24 RO, with or without supplementary class RO on the cognitive and behavioural functioning of a large sample of dementing subjects; and (2) test the effect of residential care setting on the outcome of 24 RO treatment.

Method

Subjects. A subset of forty of the sixty subjects used in Experiment 1 was selected as follows. For the hospital the already matched class RO and control groups, in each of the two wards (N = 40), were each sub-divided into two groups matched for degree of dementia. One control group and one class group from each ward were then randomly allocated to 24 RO. Thus four groups were established as follows:

(i) Class RO + 24 RO (N = 10)

(ii) Class RO only (N = 10)

(iii) 24 RO only (N = 10)

(iv) No treatment control (N = 10)

However, as ward staff decided that 24 RO could only be provided to 10 of the 20 subjects allocated to this condition at any one time it was necessary to randomly allocate 10 subjects to receive 24 RO for three months and then switch to the remaining 10 for a further three months. However, for reasons described later, the experiment was terminated in the hospital after the first three months with only 10 subjects having received 24 RO. Thus when it came to analysis it was necessary to retrospectively match subjects again so that the overall hospital sample was reduced from 40 to 20. The 24 RO subjects were matched blind with no treatment control subjects and class RO subjects so that groups i-iv above were each reduced to N = 5.

In the home 24 RO was allocated to all subjects (N = 10) on one section with the other section (N = 10) being designated as a control section. Thus the same four groups as described above with the same numbers in each were established across sections in the home as opposed to within wards in the hospital. The mean degree of dementia scores for subjects in each of the four conditions in both home and hospital are presented in Table 26.

Table 26

Mean degree of dementia score for each experimental condition

	24 RO + Class	Class only	24 RO only	No treatment control
Hospital	7.4 (N = 5)	7.2 (N = 5)	5.4 (N =5)	6.6. (N = 5)
Home	4.8 (N = 5)	5.0 (N = 5)	4.2 (N =5)	6.0 (N = 5)
Mean	6.1 (N = 10)	6.2 (N = 10)	4.8 (N = 10)	6.3 (N = 10)

Design

This experiment followed immediately after the completion of Experiment 1. Therefore class RO, as described earlier, was reintroduced for all subjects who had previously received it as this treatment had been withdrawn for the final six weeks of the first experiment. Twenty-four hour RO was introduced for the subjects allocated to this condition after a two week staff training period which was organized just prior to the commencement of treatment. The data from Occasion 3 of the first experiment was used as pretest data and a further set of data was collected after a further twelve weeks.

Treatment Procedure

An in-service training course in 24 RO was provided to the staff in both hospital wards and in the section of the home designated as the 24 RO unit. This in-service training involved three one hour teaching sessions, opportunity to practise RO in the class RO setting and a series of weekly case review meetings throughout the period of the experiment. The details are provided below. All sessions were repeated to cover all staff in these units, though the majority were present at the first presentation of each session. It was only possible to meet once with night staff in each setting. Sessions were designed to mix formal teaching with audiovisual demonstration, group discussion and active decision-making regarding details of the 24 RO programme.

Session 1

(i) Introduction - recap on the class RO work conducted earlier, the deficits in dementia and the care environment, and the rationale for a 24 RO approach to care. Handout of a folder to each staff member con-training (a) guidelines and articles on RO; (b) patient information sheet;/

(c) RO procedures inventory; and (d) RO materials inventory.

(ii) Tape-slide presentation on 24 RO (American Hospitals Association, 1976).

(iii) Discussion of tape-slide presentation and formal teaching of the components of 24 RO, namely (a) provision of verbal information on time, place and person; (b) correction of confused or rambling speech and behaviour; (c) prompting of independent behaviour, allowing time for and rewarding responses; and (d) providing orientation aids in the environment.

(iv) Explanation and allocation of homework assignment involving reading handouts, completion of patient information sheet (one experimental 24 RO subject per staff member), completion of procedures inventory and inspection of materials inventory.

Note: the rationale and purpose behind using inventories in the training was the general need to structure staff involvement in the implementation of the programme, as well as provide useful information as follows:

<u>Patient Information Sheet</u> - designed to collect basic information on subjects' social history and help 'individualize' each subject. Unfortunately, in both hospital and home, such basic information, e.g., school attended, occupations, interests, was often not known for the patients/residents and the written records were scanty and focussed primarily on the medical aspects of care.

<u>RO Procedures Inventory</u> - designed to report how staff see themselves providing care before the 24 RO was introduced. A useful discussion tool in helping staff focus on how they interact.

<u>RO Materials Inventory</u> - designed to allow staff to evaluate the existing orientation/activity aids in the care environment, select suitable aids for introduction to their own setting and/

and formulate plans for acquiring these aids.

The three inventories are presented in Appendix 13.

Session 2

(i) Brief recap of previous session. Answer questions on homework.

(ii) Tape-slide presentation on the common pitfalls that underminte consistency in 24 RO. This included a staff participation game called "Pass it on", designed to teach the value of clear, simple verbal and written communication both between staff and between staff and residents.

(iii) Discussion of completed RO Procedures Inventory.

(iv) Group completion of the RO Materials Inventory and decision making on what aids to introduce and how to acquire them.

(v) Formal allocation of staff on a rota basis to attend and assist in class RO sessions.

(vi) Homework - complete Patient Information Sheet in preparation for individual case work-ups at the next session.

Session 3

This took the form of a case conference where the personal information gathered for each 24 RO subject was discussed along with the data derived from assessment on verbal orientation, behavioural assets and deficits and spatial orientation. A brief RO care plan was drawn up for each subject and (in the home only) a Kardex procedure involving daily observations was established. An example of a care plan is shown in Figure 20. Possible options for meaningful activity were discussed and planned for each subject. These ranged from such activities as helping with dishes to delivering newspapers to attending recreational activities. The rationale was simply to improve the 'reality' of subjects' daily lives and provide a vehicle for communication between staff and residents. Only 24 RO subjects were specifically considered for these activities, though all residents had some pre-existing level of involvement.

R.O. Care Plan

William has a reasonable memory for events that happened in the past but has difficulty keeping up with recent happenings. His orientation to place is good, he recognizes people even though he can't remember names but he definitely does need assistance when it comes to understanding the passage of time. He should be continuously but casually provided with information that will help him understand how long he has been at Greenlea, when he visited his sister last and when he can do so again, etc. Also, basic information such as day, month and year should be provided. Encouraging him to follow the football results in the paper would be one way of helping him keep track of time and also maintain an old interest. Keeping a diary outlining present and future activities would also help in this respect.

Behaviourally, Willie has little difficulty. He cares for himself and the only noticeable disability is not being able to locate his own clothes. His wardrobe should be clearly marked and he should be expected, with assistance at first, to locate and also put away his own clothes.

Occasionally also, Willie has difficulty finding his way around the unit. He should be encouraged and reminded to use the signs.

Willie likes to help and it could be beneficial if he were given some small task to do on a regular or rota basis.

In summary, attention should be directed at:

- orientation to time through reminding, reading newspapers, keeping a diary and emphasis on developing and following a worthwhile daily routine;
- location of clothes through direct training;
- independent movement around the unit by encouraging use of signposts.

Figure 20. Example of RO Care Plan.

Follow-up

This case conference approach was continued at weekly meetings until all 24 RO subjects had care plans. Weekly meetings continued throughout the 12 weeks providing a chance to monitor progress and plan alternative individual strategies. In the home individual care staff were each allocated responsibility for completing Kardex notes on one particular subject. The programme was also explained to relatives by way of personal contact, often by telephone. This was a follow-up to a formal consent letter despatched six months earlier at the start of class RO. The follow-up proved useful in encouraging relatives' participation and also gathering social background information.

It should be noted that by this stage in the experimental sequence each of the class RO therapists had been separately assigned to either the home or the hospital setting. The role of each was expanded at the start of the 24 RO programme so that their duties included modelling staff-patient communication on the ward/section and helping staff develop activities with residents. The basic premise, however, that RO uses existing staff-patient interactions, was maintained. No deliberate attempt was made to intervene in the existing care regime to the extent that increased staff-patient interaction was demanded. This was of course implicitly encouraged in the everyday contacts between the experimenter and/or therapist and the care staff. An experiment is presented later which presents data on the changes in staff-patient behaviour observed to occur, or not occur, as a result of 24 RO implementation.

Regarding aids to orientation, the following were provided in the first two weeks of the experiment after consultation with the staff group:

1. Clocks - large clocks were provided in all dayrooms.
2. Calendars - large month by month calendars were provided in all dayrooms.
3. Noticeboards - a large (3' x 2') felt board was provided in each of/

the hospital dayrooms and a magnetic 4' x 3' whiteboard on the wall opposite the dining room door in the home. This was used to display the name of the hospital(home), the ward (section), the day, the date and the year. Below this was provided such details as the day's menu, the next day's menu, activities available to patients (residents), times of activities scheduled for the 24 RO subjects, and the names of residents in RO class. Also displayed were posters of forthcoming events, pictures of residents and staff at various social gatherings and greeting cards received from relatives, staff on holiday, etc. Much more use of this board was made in the home where more activity of interest to residents seemed to occur.

4. Signposts: three-dimensional signs, as already described in Experiment 3, were provided on doors leading to all main areas of the ward or section. Additionally, in the home, 24 RO residents attended handcraft and made personal motifs based on a subject of interest, e.g., favourite flowers, football clubs, etc. These were then displayed on bedroom doors as an aid to orientation. Otherwise bedrooms in the home were unmarked whereas in the hospital ward signs were provided. In the home a red postbox was constructed by staff and placed in the corridor as a stimulus for letter writing and an aid to independence in posting them. As already described the signs in the home were primarily pictorial whereas the ones in the hospital were worded. This disparity was not intentional, but like many other minor differences between the programmes in the two settings, illustrates that the programme must be adjusted to fit the setting. In this case the administration of the home were not prepared to implement word signs, thinking them to have an 'institutional' flavour but were interested in adopting pictorial signs instead.

5. Name tags - all care and domestic staff were provided with large, specially prepared name tags indicating clearly either their first name or surname. Both names were not provided as this required extremely large tags if letter size was not to be reduced. Here again differences emerged between the care settings. Whereas the home enthusiastically adopted the use of names only, the nursing administration in the hospital demanded the use of existing hospital tags denoting position, initials and surname in very small, almost illegible print.

6. Diaries - all 24 RO subjects were provided with personal diaries which were kept up to date with the help of staff. Subjects were encouraged to use their diaries to solve their own questions, e.g., when a particular visitor had last been to see them.

Earlier in this chapter orientation aids were described as one of four components in 24 RO. The within wards matched design adopted in the hospital necessitated that this component was available to all subjects, both 24 RO and control. However, some of the aids used were exclusive to the 24 RO subjects, e.g., diaries and some information on the noticeboards. Also staff were requested to direct only the attention of the 24 RO subjects to these aids. Nonetheless, the effect of the orientation aids on the control subjects might be assumed to reduce the experimental effect for 24 RO rather than increase it in the analysis.

Results

Data was collected before and after the twelve week 24 RO programme. The same measures as employed in Experiments 1 and 2 were used, except the Kosekela Test and Spatial Orientation, which had to be dropped as on pre-test insufficient time was available to complete them. The independent variable of 24 RO was substituted for degree of dementia and a four-way analysis of variance for occasions, 24 RO, class RO and place was completed for each measurement variable.

Tables 27-29 summarize the results for the cognitive, behavioural and activity measures respectively.

Table 27

Summary of significant effects from four-way ANOVAR of cognitive variables for occasions (O), 24 RO (F), class RO (C) and place (P)

	Orientation Test			
	Time	Place	Person	Total
Between group effects				
Main effects:				
Four (F)	05			
Class (C)				
Place (P)	005		005	005
Interactions:				
F x C				
F x P				
C x P				
F x C x P				
Within group effects				
Occasions (O)		05		05
O x F				
O x C				
O x P		05		
O x F x C		01		05
O x F x P				
O x C x P				
O x F x C x P	005			01

Table 28

Summary of significant effects from four-way ANOVAR of behavioural variables for occasions (O), 24 RO (F), class RO (C), and place (P)

	G.R.S.				Ferms Fields											
	ADL	WA	AD	Total	1	2	3	4	5	6	7	8	9	10	11	Total
Between group effects																
Main effects:																
Four (F)																
Class (C)																
Place (P)																
Interactions																
F x C																
F x P																
C x P																
F x C X P																
Within group effects																
Occasions (O)							01	05								
O x F					05			05								05
O x C																
O x P											05					
O x F x C											05					
O x F x P																
O x C x P																
O x F x C x P																

Table 29

Summary of significant effects from four-way ANOVAR of activity variables for occasions (O), 24 RO (F), class RO (C), and place (P)

	PS	NS	AS	PA	AA	TA	IP	IG	IS	IO	IN	AP
Between group effects												
Main effects:												
Four (F)												
Class (C)									05			
Place (P)				00		00						
Interactions:												
F x C												
F x P					0005	05						
C x P												
F x C x P												
Within group effects												
Occasions (O)				06	05					05		
O x F				06								
O x C												
O x P				01	05							
O x F x C												
O x F x P												
O x C x P												
O x F x C x P												

The complete set of ANOVAR tables for these analyses are presented in Appendix 14.

Cognitive variables

A highly significant main between groups effect for place is apparent for three of the four cognitive variables and a significant main between groups effect for 24RO on one (time orientation). Subjects in the two settings therefore appear again to differ significantly in their level of total orientation and on time orientation the 24RO subjects are superior to the controls.

A significant main within groups effect for occasions occurs on total orientation and place orientation. A second order interaction between occasions x place occurs for place orientation and a third order interaction between occasions x 24RO x class RO occurs for both total orientation and place orientation. Total orientation also shows a higher fourth order interaction for O x F x C x P as does time orientation. These fourth order interactions were broken down by separate three-way ANOVARS for O x F x C for the hospital subject group and then the home subject group. The 3-way O x F x C interaction for place orientation was broken down by separate two-way ANOVARS for O x F for the class RO and no class RO subject groups respectively, ignoring the factor of location which was not significant.

The 3-way O x F x C ANOVAR of total orientation in the hospital group revealed that although the class RO alone, 24RO alone and class RO and 24RO groups appear to improve and the no treatment controls deteriorate, the O x F, O x C and O x F x C effects are not significant. In the home however O x F x C proved significant (P 0.02) with the group receiving a combination of 24RO + class RO showing very favourable improvement. In contrast the groups receiving 24RO alone or class RO

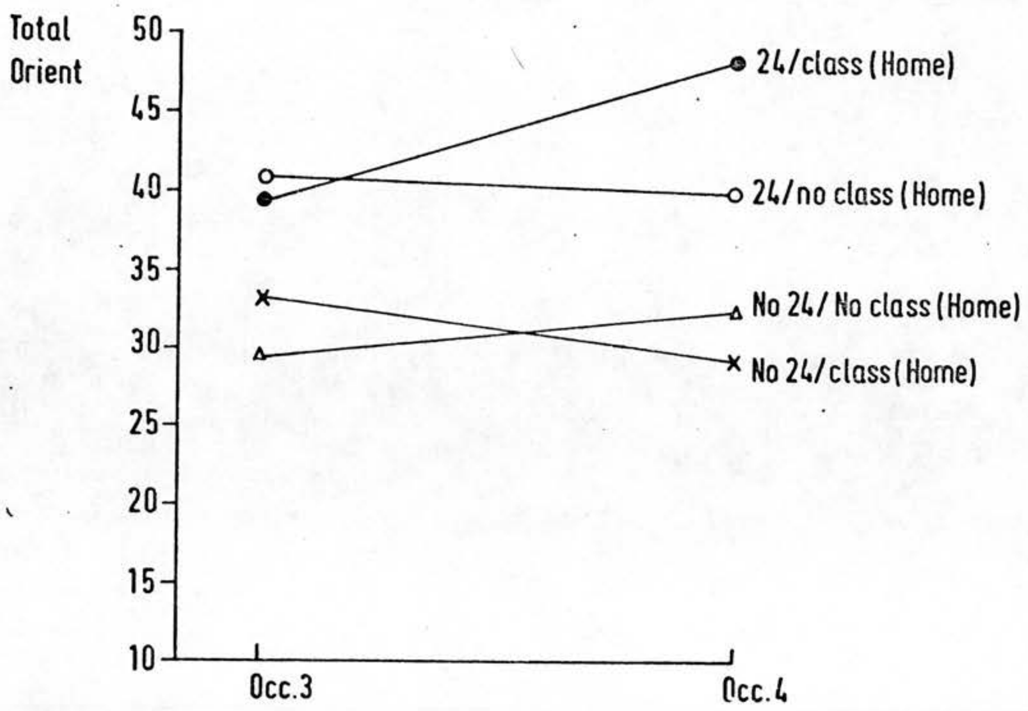


Fig. 21 Change in Total Orientation for the four treatment groups across occasions 3 - 4 in the home. O x F x C ($P < 0.02$). O x F (class gp) $P < 0.01$.

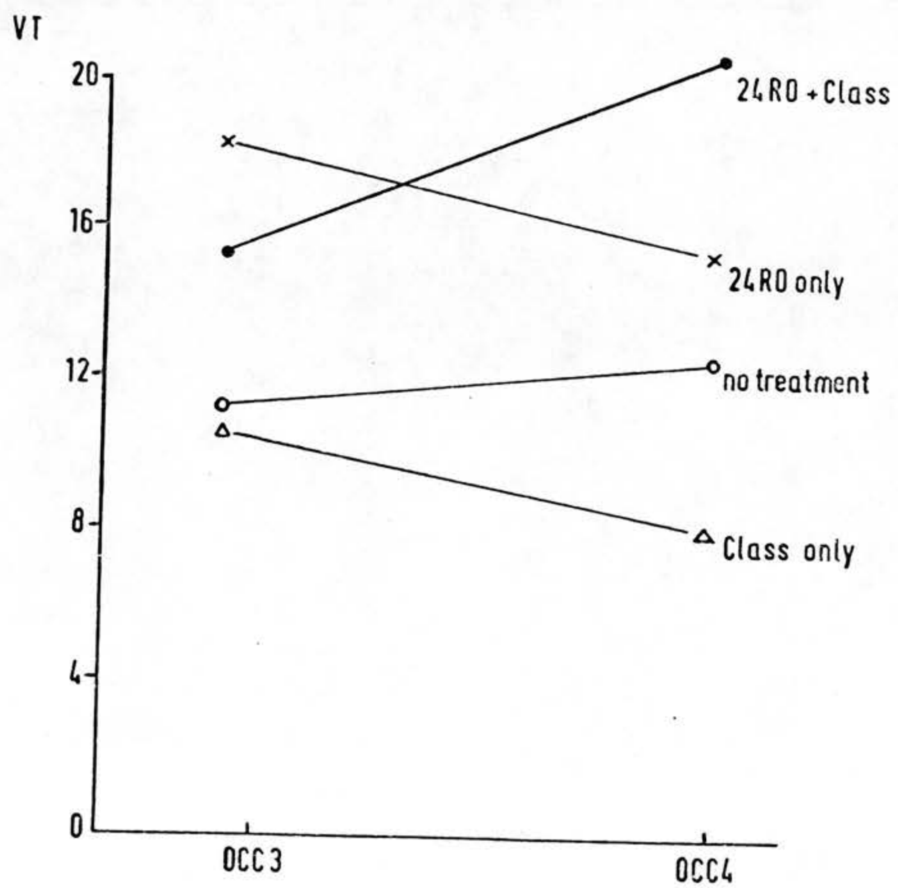


Fig. 22 Change in Time Orientation for the four treatment groups across occasions 3 - 4 in the home O x F x C ($P < 0.02$).

alone show slight deterioration. These changes are graphed in Fig. 21.

The 3-way O x F x C ANOVAR of time orientation revealed very similar results. In the hospital group no significant O x F or O x C effect or O x F x C was demonstrated while in the home O x F x C again proved significant (P 0.02) with favourable improvement evident for the combined 24RO + class RO group. Again the 24RO alone and class RO alone groups show a slight drop in time orientation. These changes are graphed in Fig. 22.

Separate two-way ANOVARS for the class RO and no class RO groups in the home were also completed to test the signficance of the O x F effect for these two groups on total orientation. The O x F effect for the class group was significant (P 0.01) while for the no class group O x F was nonsignificant. See Fig. 23.

The two-way ANOVARS completed for place orientation in the class and no class groups revealed that for the class group O x F approached significance (P 0.1). The O x F effect for the no class group proved nonsignificant.

These results indicate strongly the complex interaction between treatment procedures and location. Twenty-four hour RO led to significant improvement primarily in the home setting and even there only in the presence of ongoing Class RO. The location effect however did not seem important in relation to improved orientation to place.

<u>Behavioural variables</u>

No significant main between groups effects are evident. A main within groups occasions effect is shown for F3 (dressing) and F4 (eating). Of particular interest are the significant second order O x F interactions for F1 (ability to move), F4 (ability to eat) and

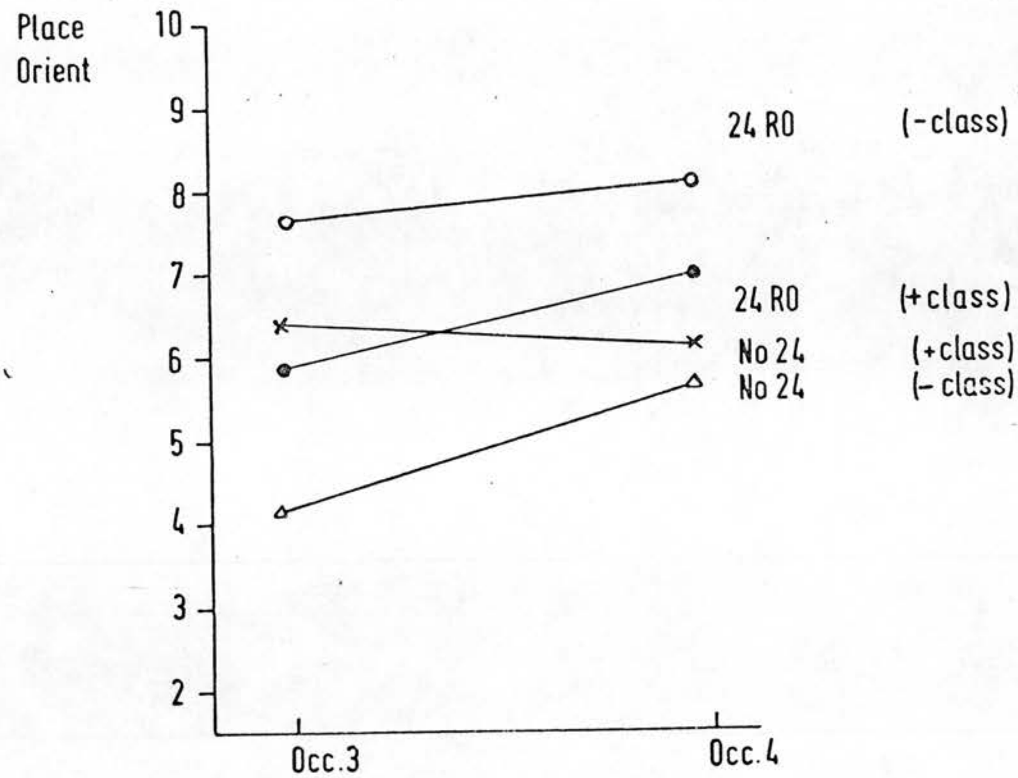


Fig. 23 Change in Place Orientation for the four treatment groups across occasions 3 - 4. O x F (P < 0.1).

FT (Ferm's Fields Total). Hobbies (F11) also approached significance (P 0.1). These effects are graphed in Fig. 24. It can be seen that improvement in all these measures favours the 24 RO group, whereas the no 24RO group deteriorate on all four measures the 24RO group improve on three and stay even on the other.

It should be stressed that this is a general treatment effect holding true across both place and class/no class conditions, unlike the cognitive variables, where there is a clear interaction between 24RO and class for the home sample only.

A significant third order O x F x C interaction was evident however for F7 (ability to communicate). This was broken down by separate 2-way analysis to examine the effect of 24RO in the class and no class groups. In the no class group O x F approaches significance in favour of 24RO (P 0.09).

Activity variables

Main between groups effects for place are shown on passive activity and total activity and there is also a main between groups effect for class on interaction with staff. Second order between groups F x P interaction effects are shown on active activity and total activity. Main within groups occasions effects are also evident for passive activity, active activity and interaction with others. Second order O x P interaction effects are present for passive activity and total activity and the only significant O x F effects are for passive activity and active posture. These are graphed in Fig. 25. It can be seen that the 24RO group shows a reduction in both the percentage of time spent in passive activity and the percentage of time spent in active posture (standing or walking).

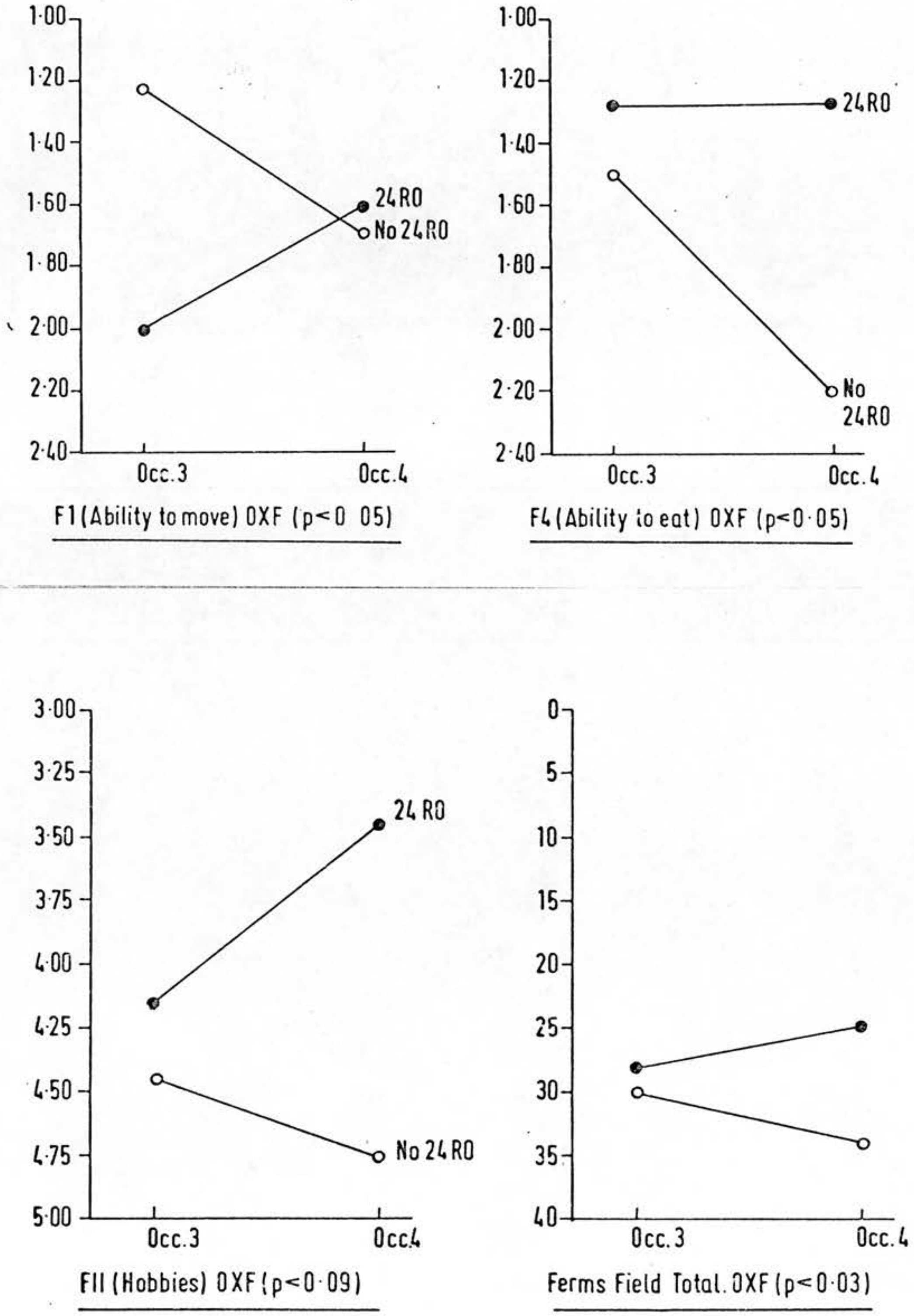
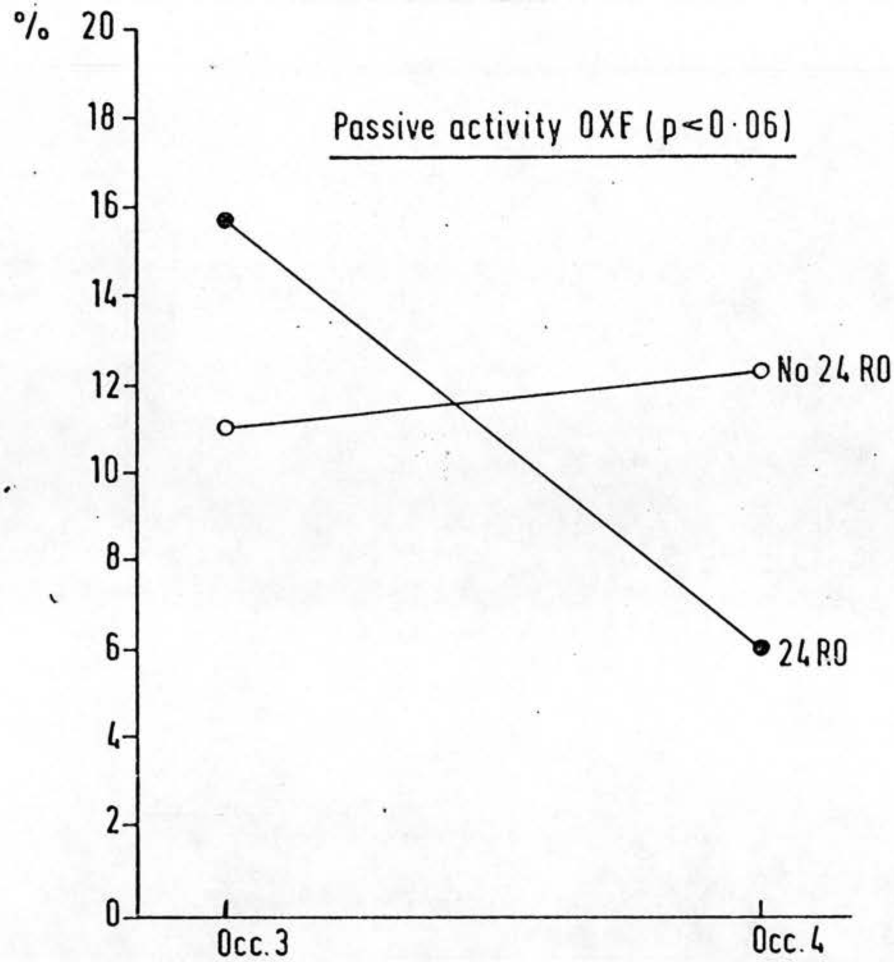


Fig. 24 Change on behavioural variables for 24RO and no 24RO groups across occasions 3 - 4.



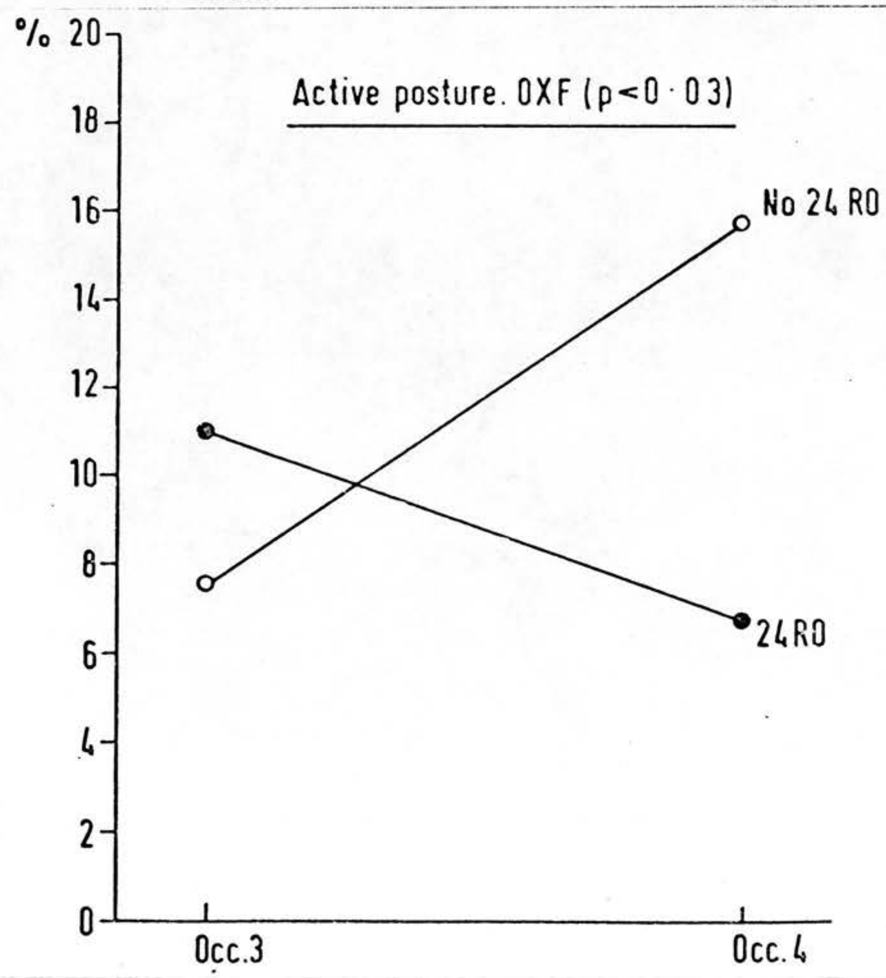


Fig. 25 Change in Passive activity and Active posture for 24RO and no 24RO across occas. 3 - 4.

Discussion

These results provide strong support for the effectiveness of 24RO. The improvement demonstrated on the cognitive orientation variables is, however, related closely to the interaction between 24RO, class RO and type of setting. The strongest change occurs in the home setting where a combination of 24RO and class RO leads to a marked improvement in both total orientation and time orientation. When no class RO is present the effect of 24RO alone on these variables is not significant. No significant effects for 24RO were demonstrated in the hospital for total orientation and time orientation but for place orientation the improvement with combined treatments is spread across both home and hospital settings.

It is interesting to note that these orientation changes were demonstrated on the 25-item extended orientation test which showed up no significant changes in the first two experiments on class RO. It might be concluded that change on this extended test reflects a more generalized improvement than was evident for class RO treatment in Experiments 1 and 2 where only the shorter Koskela Orientation test showed a significant treatment effect.

The most dramatic aspect of the present results is the demonstrated improvement on the behavioural variables for the 24RO treatment group. This is the first study to demonstrate such change for either form of RO and it is important to note that the improvement, in contrast to the cognitive orientation variables, is not dependent.

on an interaction with class RO. Ability to move, eat and demonstrate independent hobby activity all improve with 24 RO. The total score on the Ferm's Fields of Behaviour Scale is significantly enhanced by 24 RO. Ability to communicate also shows improvement, albeit non-significant, with 24 RO. On this variable there is an interactional effect with class RO - not surprising considering the emphasis placed on communication in class RO. These results are the first to clearly demonstrate behavioural improvement as a result of RO. The origins and continuing popularity of 24 RO in the United States always bespoke a confidence, albeit empirically unverified, that 24 RO brought about behavioural improvement. This does seem to be the case and the role of class RO, always seen in the U.S.A. as purely supplementary to 24 RO, is influencial only in regard to change on cognitive variables.

The results for the activity variables of passive activity and active posture are consistent with the results from the earlier experiments on class RO. These variables show a decline as a result of treatment indicating that 24 RO subjects spend more time sitting and less time engaged in passive activities such as reading, watching television, etc. This reduction may reflect slightly increased activity in other areas, e.g., social interaction, but the results certainly do not suggest significant changes in these areas. Perhaps reduced ambulatory activity reflects decreased agitation rather than increased apathy/moribidity. The result for passive activity is less easy to understand as it certainly runs counter to the expected direction. Subjects receiving 24 RO would be expected to take more interest in their environment, not less.

As was the case earlier for class RO, where two experiments were reported, the next experiment is a further evaluation of 24 RO conducted over the longer term of six months. This is conducted on the home sample only as 24 RO was terminated after three months in the hospital. The reasons for termination in the hospital were clinical and practical rather than experimental. It was apparent that the hospital regime was not conducive to effective treatment programming. Morale and staffing levels were both low and staff turnover was high. It was apparent that the majority of staff did not sympathize with the RO approach. An example of this was the unwillingness to place the full complement of subjects on 24 RO at the same time. No support from the nursing administration was evident and the overall ethos of care was extremely custodial. On one of the two hospital wards staff failed to avail themselves of the opportunity to participate in RO classes and neglected to involve the patients with readily available recreation programmes within the hospital complex. Extremely poor personal relationships existed between the staff on this ward. Considerable energy was expended by the personnel of the experiment to try and overcome these obstacles, e.g., by taking 24 RO subjects to outside activities when nurses failed to do this, etc. Anecdotal examples of the problems in the hospital setting are almost endless but in short they can be summarized by saying that the 24 RO programme in the hospital did not have the appearnce of a successful programme. It may not be totally fair to lay all blame for this on the staff concerned. The organisational structure of the hospital and conditions of service of nursing staff seemed to play a part as did the factor of an extremely large number of severely demented patients in these ward populations. The finding of significant effects for 24 RO is all the more impressive given that half the subjects came from this setting.

In contrast the 24 RO programme at the home had many signs of true implementation. The staff were enthusiastic in adopting it, participated fully in in-service training and class RO sessions and receives support from outwith the section involved. Staff relationships and leadership were good and the RO programme was integrated easily into the style of care provided. General morale was also high, absenteeism low and the staff group appeared to work as an effective team. All this of course is, by necessity, anecdoctal commentary. However, such factors as the ones described obviously do play a part in determining whether it makes sense practically to maintain a therapy programme. Therefore, although it was obviously deleterious to the experimental design the decision, hard as it was, was taken to terminate 24 RO in the hospital and continue the longer term study in the home only.

CHAPTER 11: EXPERIMENT 5

An Evaluation of the Longer Term Effects of Implementing a Programme of Twenty-four Hour Reality Orientation with Dementing Subjects

Introduction

As already mentioned in Experiment 4 it was necessary to terminate 24 RO in the hospital after only three months of implementation. However, as 24 RO, even more than class RO, is a programme emphasizing the importance of providing a consistent, permanently modified interpersonal and physical environment for the dementing elderly it was appropriate to maintain the 24 RO programme in the home and evaluate its effects over the longer period of six months.

Experiment 1, already described, indicated that class RO benefitted subjects when consistently applied over a short period but that gains were eroded when the programme was withdrawn. Experiment 2 showed that when evaluated over the longer term of one year no significant gains were evident for subjects receiving class RO. The present experiment will determine whether the gains evident for 24 RO over a three month period suffer a similar fate or maintain at six months. The basic rationale underlying the longer term evaluation of treatment approaches in progressive dementia has already been described.

Method

The home sample described in Experiment 4 was employed and the 24 RO programme already described was maintained according to the same procedures for three months. A further set of assessment data was collected at the end of this period. Thus it is possible to examine the changes over the six months from month 6 when class RO was re-introduced and 24 RO started to month 12 when the final data collection was completed (see Figure 5). It should be noted that although for experimental purposes the 24 RO programme finished at month 12, it is still maintained by staff in the home some nine months after the experimental work ceased.

Results

Three-way ANOVAS for occasions, 24 RO and class RO were completed for each measurement variable. The results for the cognitive, behavioural and activity variables are shown in Tables 30-32 respectively and the ANOVA tables are presented in Appendix 12.

Table 30

Summary of significant effects from three-way ANOVAR of cognitive variables for occasions (O), 24 RO (F) and class RO (C)

	Extended Orientation Test			
	Time	Place	Person	Total
Between group effects				
Four (F)	05	005		05
Class (C)				
F x C				
Within group effects				
Occasions (O)				
O x F	05		03	01
O x C				
O x F x C		05		

Table 31

Summary of significant effects from three-way ANOVAR of behavioural variables for occasions (O), 24 RO (F) and class RO (C)

	GRS				Ferm's Fields											
	ADL	W/A	A/D	Total	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	Total
Between group effects																
Four (F)		05		01												
Class (C)																
F x C	04						05									
Within group effects																
Occasions (O)																
O x F								04								01
O x C													06			
O x F x C																

Table 32.

Summary of significant effects from three-way ANOVAR of activity variables for occasions (0), 24 RO (F) and class RO (C)

	PS	NS	AS	PA	AA	TA	IP	IG	IS	IO	IN	AP
Between group effects												
Four (F)					05				02			
Class (c)									05			
F x C												
Within group effects												
Occasions (0)				05							05	
0 x F										05		
0 x C												
0 x F x C												

Cognitive variables

A significant main between groups effect for 24 RO is evident for time, place and total orientation. As no occasions effect is present this indicates that the 24 RO and no 24 RO groups in the home were significantly different in orientation levels on pretest at month 6. Significant within groups 0 x F interaction effects are evident for time ($p < 0.05$), person ($p < 0.03$) and total orientation ($p < 0.01$) and place orientation shows a significant 0 x F x C effect ($p < 0.05$). These changes are graphed in Figure 26 from which it can be seen that time, person and total orientation all change in the predicted direction with the 24 RO group showing improvement and the no 24 RO group showing deterioration. On total orientation, with a maximum score of 60, the means for the two groups differ by 7 at pretest and by almost 17 at post-test. It can be reasonably concluded that although different at pretest the two groups show different patterns of change over time with 24 RO treatment being the primary factor determining this difference. For place orientation the interaction between 24 RO and class RO indicates that a combination of these treatmentsproduces improvement. Neither 24 RO alone nor class RO alone appear to be as effective as either no treatment or combined treatment.

Behavioural variables

On the GRS, withdrawal/apathy and total score show main between group effects for 24 RO. However, as in the earlier experiments, this scale fails to show up any significant within groups treatment effects. On 'activities of daily living' there is an F x C between groups interaction effect with no accompanying within groups treatment effect.

On the Ferms Fields F4 (ability to eat) a significant within groups O x F effect is shown ($p < 0.04$). The O x F effect for total score approaches significant ($p < 0.1$). Figure 27 graphs these changes.

Although not of primary concern in the present experiment, the significant ($p < 0.06$) within groups O x C effect for F9 (recognition of persons) is worth a comment, indicating as it does that irrespective of 24 RO, those receiving class RO in the home were rated as improved in their ability to recognize persons over this period (Figure 27). None of the Ferms Fields variables show main between groups effects though F3 (ability to dress) shows an F x C interaction effect. Thus, in contrast to the orientation and GRS measures the groups appear balanced on Ferms scores.

Activity variables

Main between groups effects for 24 RO are evident on active activity and interaction with staff. Likewise a main between groups effect for class RO is evident for interaction with staff. The only significant within groups treatment effect is an O x F effect for interaction with others ($p < 0.05$).

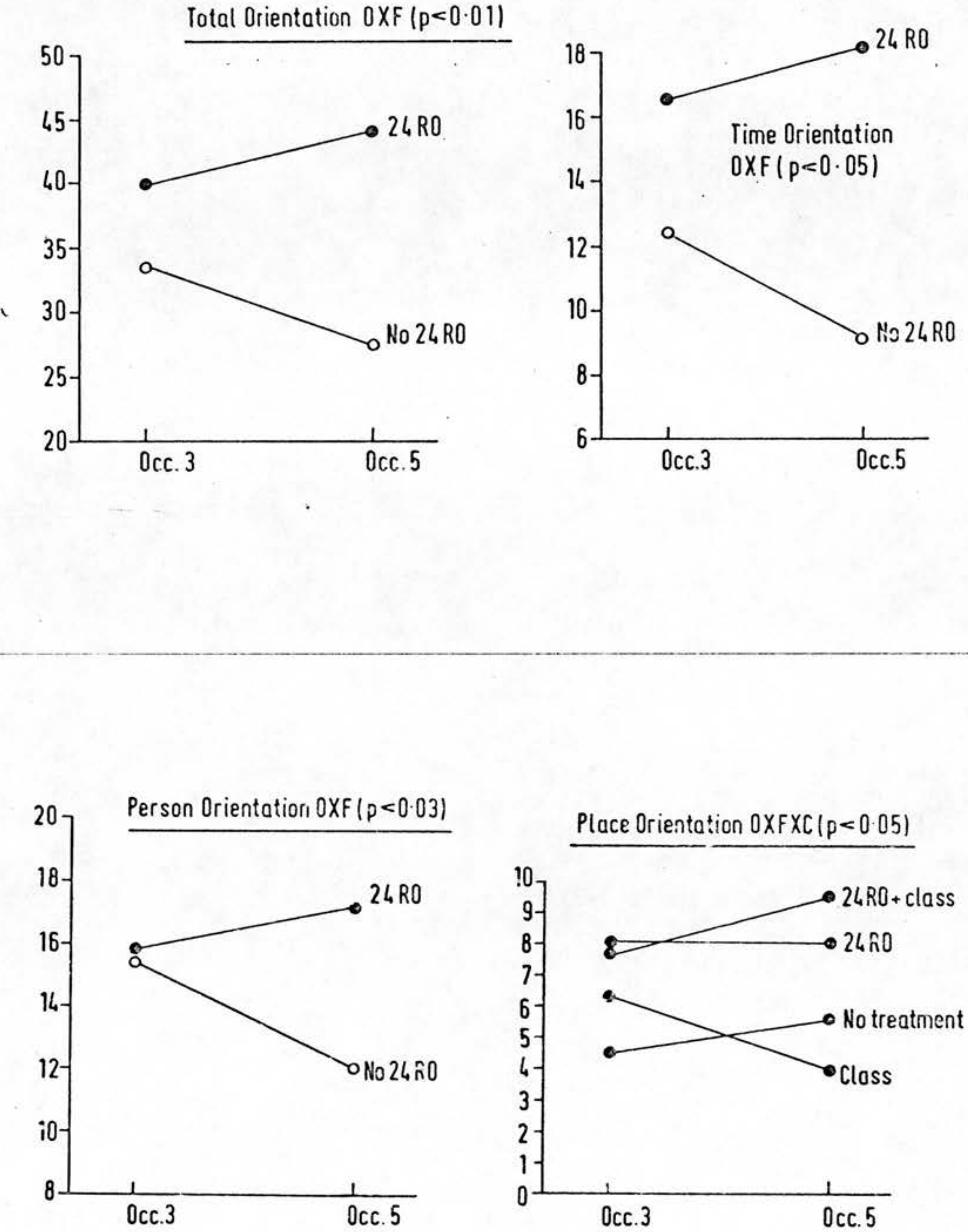


Fig. 26 Change in Orientation variables across OCC 3 - 5 for 24RO and no 24RO.

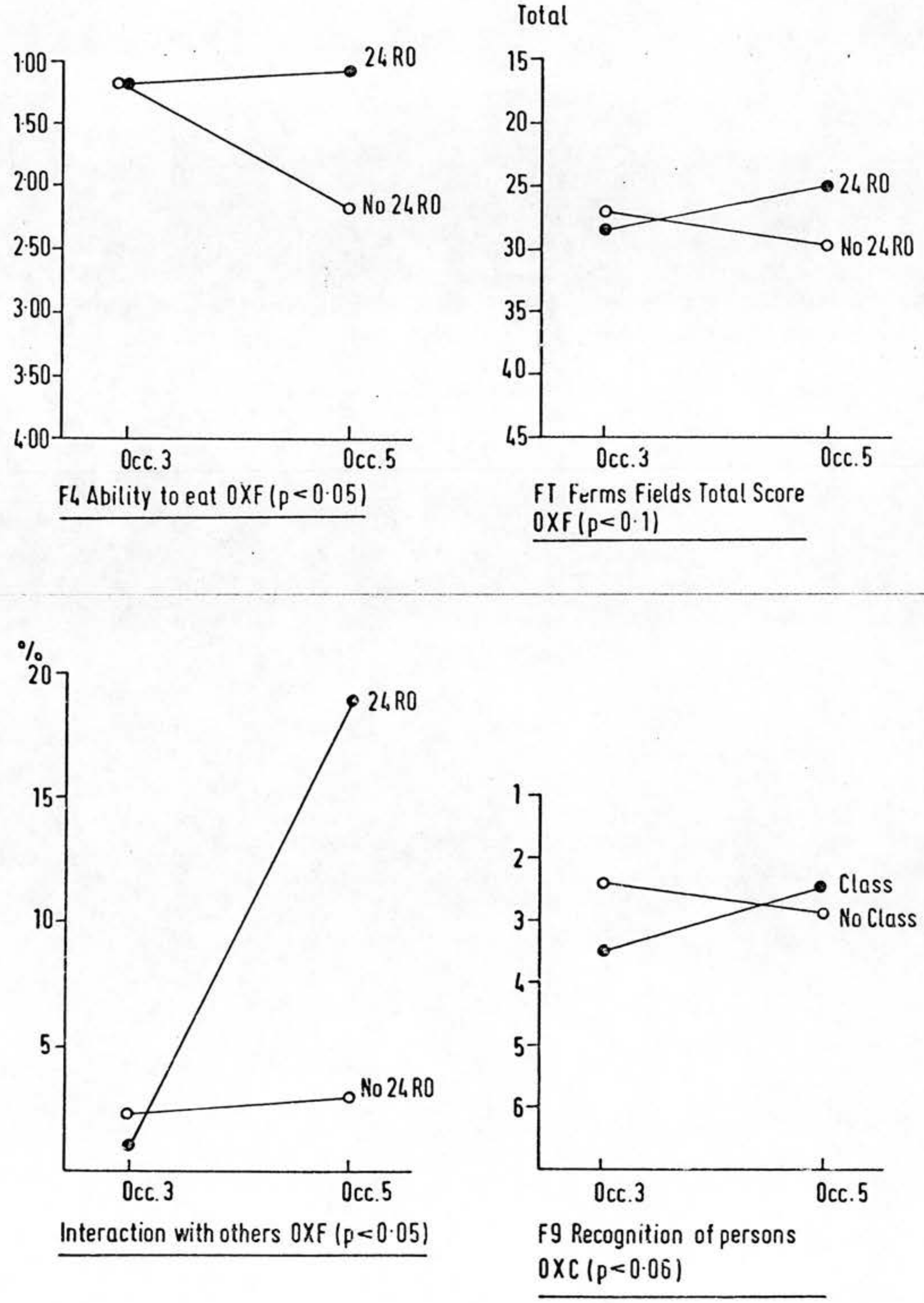


Fig. 27 Change in behaviour variables across OCC 3 - 5 for 24RO and no 24RO

This is graphed in Figure 27 and shows that the 24 RO group increase their frequency of interaction with others while the no 24 RO group remains stable.

Discussion

The improvements in orientation evident over the six month period examined in this experiment are (a) more extensive and (b) more closely related to the presence of 24 RO alone, than the improvements evident over the shorter three month period reported in the previous experiment. Whereas no 24 RO treatment effect was detected for person orientation in the shorter trial, this appears as significant in the present study.

The significant treatment effects demonstrated on time, person and total orientation are all first order O x F effects in contrast to the last experiment where the effects were second order interactions between 24 RO, class RO and occasions. Thus it would appear that over the longer term application of 24 RO, improvements in orientation can be achieved, which in contrast to a short term application, are independent of the presence or absence of class RO. The only exception to this is place orientation where an O x F x C interaction is still evident and suggests the superiority of combined 24 RO and class treatments. These results indicate that 24 RO, unlike class RO increases in potency as a modifier of cognitive orientation ability, the longer it is applied. As will be discussed in more detail later this may also be interpreted to imply that in the short term the introduction of class RO as well as 24 RO holds benefits but as the 24 RO programme continues the significance of class RO becomes much reduced. This ties neatly with the results from Experiments 1 and 2 where, when applied alone, class RO seems to produce improvements in the short but not the long term.

The improvement evident on the behavioural variables is not as extensive in this study as in the previous shorter trial. Only F4 (ability to eat) still shows a significant treatment effect favouring 24 RO and the total score on the Ferm's, significant at $p < 0.05$ in the shorter trial of 24 RO is reduced to $p < 0.1$ in this study.

The significant reductions in passive activity and active posture reported after three months of 24 RO are no longer evident after six months. The only activity variable to show change at six months is interaction with others. It is not clear whether this reflects an increased interaction by the subjects with others (visitors, domestics, activity rater, etc.) or increased attention paid to 24 RO subjects by these others.

In conclusion, it appear that extended application of 24 RO leads to clear cut changes in orientation which are independent of the presence of class RO. Behavioural gains are still evident but less dramatic than the gains achieved in the short term. There is no support, therefore, for the hypothesis that the difference in behavioural competence between controls and experimentals becomes greater, in favour of the treatment subjects, the longer treatment is applied. This may, from the above results, be what is happening for the cognitive variables when 24 RO and no 24 RO are compared.

CHAPTER 12: EXPERIMENT 6

An Evaluation of Changes in Staff-Patient Interaction Before and After the Introduction of 24 RO

Introduction

Twenty-four hour RO is an approach based on a restructuring of staff-patient interactions in such a way that staff provide (orientation) information, correct confused behaviour, prompt and reinforce independent behaviour and direct patients' attention to orientation aids in the environment. Assuming that these procedures are effective, as indeed the results of Experiments 4 and 5 would indicate, it is reasonable to suppose that their success is dependent on the degree to which they are utilized by care staff. Woods (1979) has already provided evidence that it is the orientating nature of the staff-patient contacts, and not increased attention per se, which produces benefits in class RO.

The present experiment examines staff-patient interactions occurring just prior to the introduction of the 24 RO programme already described and compares them, in terms of the degree to which they approximate 'good' RO procedure, with the staff-patient interactions occurring some three months after the start of 24 RO.

Method

The ten residents in the home and the ten patients in the hospital receiving 24 RO were used as subjects. An eight hour sample (covering 9 a.m. - 5 p.m.) of all interactions between staff and these subjects was observed. Interactions were rated according to the criteria of the Staff-Patient Behaviour Scale presented in Appendix 6. This scale listed six aspects of staff-patient interaction which conformed to RO procedures as evidenced by their inclusion in the RO Procedures Inventory presented in

Appendix 13 (American Hospitals' Association, 1976). Although by no means an exhaustive description of RO interaction procedures these six aspects were readily observable, and therefore it was felt could be rated reliably. The six aspects are EPV - staff engage patient verbally; SNP - staff refer to patient by name, SNS - staff introduce themselves by name; RTP - staff make reference to time or place; SEP - staff explain a procedure to patient; SRP - staff refer to an orientation aid. Other aspects of RO such as the correction of confused speech and behaviour, the prompting of independent behaviour, the adoption of an appropriate voice tone and the overall consistency achieved were considered too difficult to rate and were excluded.

Rating procedure. The 9 a.m. - 5 p.m. sample of observations were collected by an independent rater in the first week of 24 RO in-service training and in week ten after the in-service training was completed. All fifteen minute periods in the eight hour sample were observed in a random order spread over the seven day period. Each interaction occurring was coded according to which subject received it, the type of interaction as described by the six aspects of RO procedure and the number of staff on duty at that particular time. The interaction was also briefly described. The rater was positioned in the corridor area in the hospital from which all interactions in the day room and corridor itself could be easily monitored. In the home where residents occupied a number of sitting rooms, separated from the corridor by glass panelling, the rater moved up and down the corridor as staff positions altered. Occasionally, however, interactions were missed or only partially observed. These were excluded from further analysis.

In addition during the in-service training staff were asked to complete the RO Procedures Inventory already referred to.

Results

The total number of staff-patient interactions was calculated for each subject for the eight hour period before and the eight hour period after the introduction of 24 RO. Each interaction was scored from 0-6 according to the number of RO aspects present. Tables 33A and 33B present the districution of total interactions according to the 'quality' as measured on the scale 0 (no RO aspects displayed) to 6 (all six RO aspects displayed) for the ten subjects in each setting. It can be seen that in both the hospital and the home the average number of interactions per patient is relatively small over an eight hour observation period, ranging from 8 to 13 mostly brief interactions. The quality of these interactions appears similar in both settings and ranges from a mean of 1.4 to a mean 1.7. The majority of staff-patient interactions are coded as either 1 or 2.

The total number of interactions on pretest for the total of ten subjects in each setting was then examined to see the percentage of these interactions rated as involving each of the six RO aspects in turn. Tables 34A and 34B present this data and also the self-ratings of staff on how frequently they see themselves using each RO aspect in interacting with patients. Responses to items 1, 2, 3, 4, 19 and 22 of the RO Procedures Inventory were used to assess the staff's self-ratings of the aspects SNP, SNS, RTP, SEP and SRP respectively. Note - the mean of items 3 and 4 was used as the report of RTP. It can be seen that most interactions are verbal interactions (90%+) and just over half involve the patient being addressed by name. However, the other four aspects of RO communication are displayed at a very low frequency and it would appear that the high distribution of scores in the bands 1 and 2 of Table 33 is accounted for largely by the occurrence of only two RO aspects.

Table 33A

Distribution of staff-patient interactions according to quality score before and after introduction 24 RO (Hospital)

	BEFORE Quality score 0	1	2	3	4	5	6	Total inter.	AFTER Quality score 0	1	2	3	4	5	6	Total inter.
P1	0	7	8	4	0	0	0	19	1	8	4	0	0	0	0	13
P2	0	3	1	0	0	0	0	4	1	4	2	0	0	0	0	7
P3	2	3	2	1	0	0	0	8	3	3	3	0	0	0	0	9
P4	3	1	2	0	0	0	0	6	2	4	3	0	0	0	0	9
P5	0	0	4	1	0	0	0	5	0	0	2	0	0	0	0	2
P6	1	1	4	4	0	0	0	10	1	6	5	0	0	0	0	12
P7	0	5	2	3	0	0	0	10	4	13	14	3	0	0	0	34
P8	0	2	3	1	0	0	0	6	1	1	1	1	0	0	0	4
P9	0	3	5	0	0	0	0	8	1	5	3	2	0	0	0	11
P10	2	2	2	0	0	0	0	6	0	2	4	3	0	0	0	9
								82								110

BEFORE: mean quality = 1.6; mean no. staff = W1 = 4.0, W2 = 4.4; mean no. = 8.2

AFTER: mean quality = 1.4; mean no. staff = W1 = 3.9, W2 = 5.0; mean no. = 11.0

Table 33B

Distribution of staff-patient interactions according to quality score before and after introduction of 24 RO (Home)

	BEFORE Quality score 0	1	2	3	4	5	6	Total inter.	AFTER Quality score 0	1	2	3	4	5	6	Total inter.
P1	0	9	14	2	1	0	0	26	0	6	6	0	0	0	0	12
P2	0	3	9	2	0	0	0	14	0	1	6	0	0	0	0	7
P3	1	3	2	1	0	0	0	7	2	1	7	1	1	0	0	12
P4	2	1	1	1	0	0	0	5	0	5	3	0	0	0	0	8
P5	1	17	6	0	0	0	0	24	0	8	3	0	0	0	0	11
P6	1	7	10	2	0	0	0	20	0	1	7	0	0	0	0	8
P7	0	3	1	0	0	0	0	4	0	3	3	0	0	0	0	6
P8	0	3	2	0	0	0	0	5	0	5	2	0	0	0	0	7
P9	0	4	4	0	0	0	0	8	0	1	6	0	0	0	0	8
P10	1	4	17	1	0	0	0	23	0	1	9	3	0	0	0	13
								136								92

BEFORE: mean quality = 1.6; mean no. staff = 3.5; mean no. = 13.6

AFTER: mean quality = 1.7; mean no. staff = 4.1; mean no. = 9.2

Table 34A

Self-ratings of staff-patient interaction procedures vs. % observed occurrence (Hospital N = 15)

	Always	Most of Time	Half Time	Once in a While	Never	% Observed Interactions
EPV	-	-	-	-	-	91
SNP	11	5	-	-	-	48
SNS	-	6	1	6	2	0
RTP	2	3	8	2	-	9
SEP	11	4	-	-	-	14
SRP	1	3	4	5	2	1

Table 34B

Self-ratings of staff-patient interaction procedures vs. % observed occurrence (Home N = 7)

	Always	Most of Time	Half Time	Once in a While	Never	% Observed Interactions
EPV	-	-	-	-	-	96
SNP	5	2	-	-	-	60
SNS	1	1	-	5	-	1
RTP	-	2	3	2	-	4
SEP	7	-	-	-	-	6
SRP	-	3	2	-	2	-

The data in Tables 33A and 33B was then analysed using t-tests for correlated samples to test for change in number and quality of interactions after 24 RO was introduced. Table 35 summarizes the results.

Table 35

Results of t-tests comparing number and quality of staff-patient interactions before and after the introduction of 24 RO

	Number of interactions	Quality of interactions
Hospital	t = 1.07 (p = NS) df = 9	t = 0.76 (p = NS) df = 9
Home	t - 1.91 (p = NS) df = 9	t = 0.49 (p = NS) df = 9

It can be seen from Table 35 that no change was demonstrated in either the total number of staff-patient interactions or the quality of these interactions in either setting.

Discussion

The above results require discussion in the context of the findings of Experiments 4 and 5, which demonstrated that the cognitive and behavioural functioning of subjects improved as a result of the introduction of 24 RO. Two possibilities exist: (a) staff-patient interaction did not change, as the results above would indicate, and some other mechanism must be responsible for the improvements noted in 24 RO subjects; and (b) staff-patient interaction did change but the present experiment fails, for reasons of design, to show up the change. Although the former explanation is more parsimonious with the results obtained there are a number of reasons for consider/(b) to be the most likely explanation.

Firstly, only a very limited set of RO interaction variables were considered in the Staff-Patient Behaviour Scale and the interactions sampled were not fully representative of the total set of staff-patient contacts. Only interactions in the corridor, dayroom(s) and dining room were observed and then only between the hours of 9 a.m. - 5 p.m. In the pilot development of the Staff-Patient Behaviour Scale attempts were made to develop a system of observing interactions when subjects were being got up and put to bed and taken to the bathroom and toilet, etc. This proved impractical but such interactions may well be of greater importance in orientating subjects and developing behavioural independence.

The interactions in the dayroom tended to be much less purposive than the more fundamental contacts listed above. Another possibility and one often voiced by staff in other contexts is that more contact occurs between staff and patients in the evening when the day's activities are completed. This period was not sampled in this experiment. The lack of refinement in the categories of RO behaviours considered also resulted in many staff-patient interactions being underrated. For example, the statement "do you want to go to the toilet, Betty?" would only receive a score of two points - one for verbal engagement and one for addressing the subject by name. Due to the rating criteria employed the toileting prompt would receive no credit. Thus it may be speculated that the RO aspects coded may not have been the most potent aspects of good RO staff procedure.

A further comment about the rating procedure employed must be its inability, as with most rating procedures, to illustrate whether there were changes in the temporal patterning of staff-patient interactions. Reality Orientation places great emphasis on consistency of approach and it is entirely possible that staff may have become more consistent in their approach to individual subjects without markedly changing their style of interaction. This relates back of course to the content of the rating categories. For example, correction of confused behaviour was not rated and may have been one area where an improvement in temporal consistency could have had beneficial effect.

One further point about the procedure adopted in this experiment needs to be made. The pretest data was collected in the first week of RO in-service training when staff attention was obviously focussed on 24 RO. In the typical institutional settings employed in this study the provision of such an in-service training period is a very rare occurrence and there was no doubt that staff were not only partially aware of RO procedures, having been exposed to the class RO programme, but were actively anticipating the further stage of 24 RO involvement. It just might be that given this proposed surge of interest the pretest results are, to some extent, artificially elevated. Certainly the lack of significant improvement in the number and quality of staff-patient interactions cannot be explained as resulting from fluctuations in staff numbers. The mean number of staff on duty during the two observation periods is quite consistent in both settings (Tables 33A and B). The slight advantage in favour of the post-test period should, if this is a significant variable, tend to increase and not reduce the chances of showing up changes in staff-patient interaction.

Given the factors discussed above it would be premature to conclude that the introduction of 24 RO does not result in changes in staff-patient interaction behaviour. What the results do suggest, however, is that it may be necessary in staff training to pay more explicit attention to practising interaction skills. Even if the variables of staff-patient interaction sampled are not the critical variables in determining patient improvement they should nonetheless have changed dramatically as a result of successful 24 RO implementation. The fact that this did not happen but that staff nevertheless see themselves as interacting in an RO fashion when in fact they are not doing so (Tables 34A and B) should be taken as indicative of the need for structured role-playing of typical staff-patient interaction scenes. This was not employed in the in-service training already described in Experiment 4, which relied only on modelling and instruction as agents of behaviour change. It may well be that staff fully conversant with the principles of 24 RO do not properly practise 24 RO unless given such specific behaviour training.

General Discussion

The results obtained in these studies are, in the main, relatively straightforward and easy to interpret. It is possible to formulate a model describing the relative effectiveness of Class RO and 24 RO, applied either as separate entities or in combination, over periods of both short and longer duration.

In considering Class RO alone it would appear that over the short term period evaluated in Exp. 1 patients benefit from this treatment by displaying improvements on cognitive measures of orientation. This finding replicates the earlier work of Brooke et al (1975), Woods et al (1979) and Greene et al (1979). There is no indication however of a more general cognitive improvement and indeed the gains are restricted to the ten item Koskela orientation test and are not evident on the twenty three item Extended Orientation Test. No behavioural gains are evident from data collected on the G.R.S. or Ferm's Fields and changes in activity and interaction with others suggest that Class RO is acting to reduce the overall level of daily activity. Thus Class RO does not seem to have effects compatible with the general goal of "engagement" for the elderly in care (Blunden and Kushlik, 1975).

In Exp. 2, when considered over the longer term of one year, Class RO alone returns very disappointing results. No cognitive improvement is evident and the only behavioural change is an increase in hobby activity. The reliability of the ratings of hobby activity, however, was extremely low in the home (table 14) and the significance of this result must be viewed with caution. Over the longer term the activity variables do not show the same reduction as over the short term and, so at least it would appear, that when applied as an ongoing programme, Class RO does not have the negative impact on engagement suggested in the data of Exp. 1.

These/

These results are consistent with the view expressed by the Reality Orientation Training Programme, Veterans Hospital, Tuscaloosa, that Class RO is not intended for application by itself but should be used only in conjunction with 24 RO. In considering the effects of 24 RO it would appear from the results of Exp. 4 that over the short term, significant cognitive <u>and</u> behavioural gains can be achieved. The former are largely dependent on an interaction with Class RO whereas the latter are independent of Class RO. The cognitive changes are also largely dependent on residential location with improvements restricted mostly to the home setting. In contrast, the behavioural changes are not dependent on residential location and are evident across both home and hospital settings. The change on activity variables is very similar to that achieved with Class RO applied for a short period i.e. there appears to be a reduction in indices of engagement.

Over the longer six month term examined in Exp. 5, the results for 24 RO indicate a consolidation of the cognitive gains evident earlier and increased independence of the 24 RO programme in determining them. No longer is the improvement dependent on an interaction with Class RO. The behavioural gains are still evident but are not quite as strong as those achieved earlier. The activity variables show no deterioration and in fact one, vis. interaction with others, increases indicating some measure of improvement in overall engagement. These results again provide support for the expressed views of the Reality Orientation Training Programme. Twenty-four RO does appear to have considerably more impact than Class RO and in the longer term it's effectiveness is not dependent on the inclusion of Class RO. However in the short term or initial stage of application, 24 RO's effectiveness is considerably enhanced by the presence of additional Class RO. The implications of this/

this finding for staff training and programme development will be returned to later.

Probably the most significant finding emerging from this series of experiments is the demonstration of an enduring behavioural effect for 24 RO. This effect has eluded the investigators in earlier RO evaluations. However only two studies had previously attempted to evaluate 24 RO and only one, that of Citrin and Dixon (1975), included a behaviour rating scale. It is interesting to note that these investigators used the G.R.S. which, as in the present study, failed to show up significant treatment effects.

The behavioural gains achieved with 24 RO in Experiments 4 and 5 are of course quite consistent with those achieved in Experiment 3 where an analogue of 24 RO p rocedures resulted in improved ward orientation behaviour. The high reliability of the Ferm's Fields Total Score in both home and hospital settings allows confidence to be placed in the results of the main 24 RO evaluation itself but the case must be strengthened by the quite independent findings of the analogue study. The restricted nature of the behaviour change examined in the analogue study, vis. ward orientation, might by itself have raised the question of the generality of the behavioural effects of 24 RO. Experiments 4 and 5 demonstrate that behaviour change can be achieved in a number of areas but not, it would appear, in all areas of functional impairment. It must be admitted that it is difficult to interpret why some behaviours change and others do not. Indeed the areas of behaviour changes (eating, walking, hobbies) are not the ones that perhaps one would have initially predicted to change (orientation in space, recognition of persons).

The results for 24 RO are all the more impressive when one considers two factors that operated to reduce the effectiveness of the 24 RO condition. Firstly the 24 RO programme in the hospital was not considered in general terms to be a success. Any signs of effective implementation were/

were tenuous. As the hospital supplied 50% of the 24 RO sample, the demonstration of clear 24 RO effects must surely have been against the odds. It might be predicted that stronger treatment effects would have been demonstrated if the implementation in the hospital had been as successful as that in the home. The questions raised by the difficulty of implementing RO in this location will be examined later but certainly it cannot be concluded from the results of this one study that 24 RO is bound for failure in all hospital settings. However, despite the impression that 24 RO was not effectively implemented in the hospital, it should be underlined that hospital subjects did demonstrate change.

The second factor operating against the 24 RO treatment condition was the presence of orientation aids in both hospital settings. All subjects in experimental and control conditions were exposed to these aids which, as was shown in Experiment 3, may have beneficial effect even when no staff prompting or reminding is involved. Although the level of independent effect for signposts alone in Experiment 3 was not high, data on ability to name staff, collected before and several weeks after the introduction of name tags, strongly suggested an improvement in naming ability on post-test, even when name tags were temporarily removed. This data is not reported in the body of the thesis because there were several methodological weaknesses evident in its collection. One avenue of further research must be the more extensive evaluation of the effectiveness of a wide range of visual orientation aids. Given the state of our present knowledge it might be concluded that the exposure of control subjects to orientation aids may have acted to reduce the overall 24 RO treatment effect.

Based on the data from Experiments 1, 2, 4 and 5, it would appear that the effectiveness of RO procedures conforms to the following model. In the/

the short term Class RO has immediate impact on cognitive performance and also interacts with 24 RO to enhance the effectiveness of 24 RO. However when behaviour is considered, Class RO in the short term has no effect, whereas 24 RO has a positive independent effect. Over the longer term the effectiveness of Class RO diminishes considerably both as an independent agent and as a facilitation of 24 RO effectiveness. In contrast 24 RO maintains its effectiveness, facilitates cognitive change without assistance from Class RO and continues to produce demonstrable, though less dramatic, behavioural change.

When the results from Experiment 3 are brought into consideration, it would appear that the effective agent in bringing about behavioural change in 24 RO is the role of staff in interacting with subjects using RO principles. In the absence of this factor it would appear that behavioural gains can be maintained, if not introduced initially, by the presence of prosthetic orientation aids in the environment. This relates closely to the work of McClannaghan and Risley (1975) on participation where it was demonstrated that the mere physical presence of an activity aid does not greatly increase the use made of it. Similar results were reported by Powell et al (1980) in a study which attempted to increase the engagement of elderly residents in gardening activity. In the context of reorientation it might be proposed that the physical environment itself, or at least that part of it which provides visual aids, does not have a strong independent effect. The role of prompting and training by staff, in facilitating effective use of the environment by residents, seems evident.

It should be noted that the level of cognitive change demonstrated for 24 RO is much more extensive than that demonstrated for Class RO. Time, place, person and total score on the Extended Orientation Test all show change with 24 RO whereas only time orientation shows change with/

with Class RO. The Class RO effect is restricted to improvement in Koskela Orientation (ten items) for the mildly demented group and improvement in time orientation for the home subjects.

Obviously in evaluating the effectiveness of a treatment package such as RO it is necessary to consider the more general impact of the approach and also attempt to make judgements about its cost effectiveness. Statistically, significant change is not always clinically significant change and the difficulty in separating the two in dementia is obvious. It must be admitted that this research has largely concerned itself with an attempt to measure the impact of RO on recipients. The impact of RO on staff (attitudes, morale, behaviour etc.) was largely untested. What did emerge repeatedly throughout the study was the impression that staff did change, at least in the home setting. This impression was not however supported by the results from Experiment 6. As will be considered in more detail later, the programme of care in the home seemed to develop "beyond RO" with many new procedures developing as a natural consequence e.g. residents' meetings, resident participation in domestic activity etc.

Those in close proximity to the residents in the 24 RO home programme seemed in no doubt, in contrast to the experimentor, himself, that the residents were clinically improved. The data supports their impression but it must be allowed that as the behaviour ratings could not be blinded, a "halo" effect may have been operating. Class RO has been evaluated by a number of investigators to date and it would seem entirely appropriate for further research to be conducted into 24 RO with the aim of replicating the results of the present experiment. It will however not be easy for any replication attempt to blind behaviour ratings. A useful step forward might be the innovation of a direct observational procedure for measuring behaviour change as suggested by Harris & Ivory (1976). This would need to take account of the "demand pressure" exercised by staff/

staff in relationship to the behavioural "effectence" of the patients. In talking of behaviour "change" in a dementing population, we should acknowledge that in many cases behaviour is not totally lost or wholly recreated as a result of deteriorative and rehabilitative processes respectively; but rather becomes varied in frequency, inappropriate to the ongoing situation or loses its tempero-spatial integrity. What RO attempts to do is reactivate intact behaviour patterns by providing prosthetic reminders, verbal prompts and cues and partial information. Perhaps the behaviour change is wholly dependent on such a provision and does not maintain if such support is withdrawn. Behaviour rating scales tend to examine only the behaviour of the patient and construe this as a variable independent of staff behaviour.

We do not have to look far in the results of the present experiments to find an illustration of this point. The demonstration (in Experiment 3) that ward orientation improved was made wholly in the context of staff cueing ward orientation behaviour. The results do not demonstrate independent, patient initiated ward orientation behaviours to change. This needs to be tested although it falls outwith the conceptualization of RO as an approach designed to create a prosthetic environment or greater person-environment fit. It is possible that independent behaviour such as autonomous movement to the bedroom or bathroom area by a patient could occur as a result of a performance-based reorientation training. However this would not be a necessary condition for a positive evaluation of RO. It is sufficient to demonstrate that as a result of change in staff —— patient interactions, patients become behaviourally more effective. This surely must be a major gap in the results presented here. On admittedly only a small selection of mostly verbal variables in staff —— patient interaction (Exp. 6) no change was demonstrated as a/

a result of RO. This issue demands further more extensive research to ascertain what, if any, changes occur in staff procedures as a result of RO.

The results are also disappointing when the observations of social and ward activity are examined. There is no evidence that either form of RO increased "engagement" with the environment. To the contrary it appears that at least in the short-term engagement is reduced. The mechanism for this cannot be speculated with confidence. Perhaps as a result of treatment, subjects withdraw in order not to increase the overall level of stimulation they received. Perhaps there is a fatigue factor operating. Again perhaps, if one were to accept the disengagement model of social involvement and ageing, the changes might be seen as adaptive. This is all quite tenuous and one must question the overall significance of improvements in orientation and behaviour if directly observed behaviour does not appear to show changes in the direction of greater social involvement and activity. Perhaps as will be argued later a case for RO implementation can be made in terms of its impact on staff and the total process of care.

Returning to the question of cost effectiveness, it would appear that a strong argument cannot be made for the introduction of Class RO only as a management strategy. The results presented in this thesis would suggest however that such a case can be made for 24 RO. Firstly, 24 RO demands no extra resources other than some initial investment in orientation aids and staff training. The latter might need repeating from time to time. Secondly, the results themselves are most encouraging. However in fairness to the Class RO procedure, it must be noted that, over the short term, the effectiveness of 24 RO was dependent on an interaction with Class RO. It may be that Class RO is necessary to the successful implementation of a 24 RO programme and that the present result of a quite autonomous effect for 24 RO in the longer term, would

not/

not have been realized if Class RO had not been present in the earlier stages.

It was certainly the intention of the present work to use Class RO as a positive step in the direction of a 24 RO programme. As the results in Appendix 17 illustrate, Class RO is positively evaluated by staff working with the mentally impaired elderly. The parameters of Class RO are easier to define than those of 24 RO and thus Class RO serves as a model for the introduction of 24 RO. It would appear from the results of Experiment 6 that the provision of a model alone is not sufficient in itself to guarantee that staff will modify their interaction strategies with elderly residents/patients. However from the personal teaching and staff training experience of the writer, it is vital to provide a visual as well as verbal image of the programme to be introduced. Without the benefit of such, it may prove extremely difficult to interest others in the approach. In considering this point, it should be borne in mind that care staff working in residential care of the dementing elderly do not generally share the interest of psychologists, academic teachers and others in the rational, philospphy and theoretical basis of care procedures (Koskerg & Gorman (1975). Grass roots staff generally need convincing that something positive can be gained in practice. To this end, the Class RO video referred to in Appendix 17 and a tape-slide presentation of 24 RO produced by Woods (1981) are useful tools in programme implementation.

It should be mentioned that successful implementation of a programme as general as 24 RO demands change in a number of aspects of staff behaviour and attitude. At the heart of this is the basic issue of how staff see their role. This will be influenced by a number of factors only one of which is the quality of the RO in-service training programme. The present experiment does not address these issues but they are worthy of some consideration at this point lest the reader construe that 24 RO

has/

has equal effectiveness in every situation. Indeed the apparent success of the present programme in the local authority home and its failure to be maintained in the hospital, clearly indicates the influence of external variables. One of these is the degree to which the institution and, in particular, the ward or section itself, has an existing rehabilitative outlook. In some cases staff might have implicit sympathy with the basic "positive attitudes" inherent in RO. If this is so, a major hurdle is removed from the path of successful implementation of RO.

The major determinants of attitude towards rehabilitation seem to be occupational status, education and tenure in the institution (Handschu, 1973, Stannard, 1973). The first two factors seem to be most important as Kosberg and Gorman found little relationship between scores on a questionnaire measuring attitude to rehabilitation and either age or length of service of staff in a home for the aged. However the home in question was described as one already holding a rehabilitative philosophy of care. The most negative attitudes are typically held by staff in the lowest occupation bracket i.e. care assistants, domestics etc. This group is typically the group which has the most direct contact with patients/residents and therefore must be in the front line of an RO programme.

Considerable variation exists in professional attitudes to rehabilitation both from setting to setting and within different parts of the same setting. There was indication from the comments of others that the staff of the section in question at Greenlea were considered to be above the average in their pre-RO rehabilitative efforts with residents. The ease of implementation in this setting is surely related to the characteristics of this staff group as it is to the qualities of the supervisor in question. It is frequently the supervisor or charge nurse who dictates the nature of day to day procedures. In Greenlea

the/

the supervisor took a lead in ensuring that staff were encouraged to implement RO. In the hospital this was not the case. The supervisory staff are in turn responsive to pressures from administration. Here again the experience in this study was that the administration gave back-up in the home but not in the hospital. It is apparent that the success or failure of attempts to implement RO in specific situations will depend on the interaction between a number of factors ranging from the general philosphy of the institution through the level of education and training in the care staff to the nature of management support provided. We obviously need to know more about the process of RO implementation within such an ecological framework and future evaluations of RO should examine the process of implementation and not solely the parameters of the treatment.

Perhaps one measure of the success achieved in implementing RO is the degree to which it stimulates further worthwhile innovations. Several authorities including Woods (1981) have concephialized RO as a core approach to care onto which can be grafted many other techniques and procedures. This was the experience in the present study where in the home setting new activities were introduced for residents including greater involvement in domestic tasks, more opportunity for reminiscence etc. It is not always clear then where the boundary is between RO techniques and these other developments and unless care is exercised RO could be seen as plagiarising other basic provisions of care.

To return to more solid ground, it is important to consider who benefits most from RO procedures. The results of Exp. 1 suggest that Class RO benefits the mildly demented more than the gravely demented in the short term period when Class RO is effective. The mildly demented group used in this study included subjects in the moderate and first part of the severe range of the Koskela test. Due to the consideration given the variables of Class RO and place in the analyses of Exp's. 4 and 5

on/

on 24 RO, no consideration was given to the factor of degree of dementia. This was unfortunate as so few positive treatment effects emerged from the analyses of Exp's. 1 and 2 that we cannot reach a firm conclusion on the significance of degree of dementia as a factor. The results of Exp. 3 shed some light on the matter. Here the gravely demented subjects benefitted from the specific orientation training strategies as much as the more mildly demented. It is probable that equal degrees of improvement have different clinical significance depending on the initial severity of impairment. Further research should examine more closely the relationship between change and degree of dementia and attempt to measure the clinical significance of change at different points along the continuum from mild-grave dementia.

This leads to the question of whether RO acts as a preventative measure or at a higher rehabilitative level. The data throughout Experiments 1, 2, 4 and 5 consistently supports the view that actual improvements (rehabilitation) can be achieved. Where positive treatment effects are displayed, these generally take the form of control group deterioration and treatment group improvement. Good illustration of this is provided in the cognitive and behavioural changes evident when 24 RO was applied over six months in Exp. 5. The changes in time, person and total orientation all conform to the above pattern (fig. 26) as does the change in total score on the Ferm's Fields (fig. 27). Likewise the more generalized behaviour change demonstrated when 24 RO was applied in the short-term (Exp. 4), conforms to an overall improvement for the 24 RO subjects and a corresponding deterioration for the controls (fig. 24). Thus it would appear that over the durations of treatment tested in this study, 24 RO shows an effect which is rehabilitative as well as preventative.

From a practical perspective it is unlikely that a full RO programme can be provided to all patients/residents who require such care in a

typical/

typical hospital or local authority home setting. The work of Pattie, Gilleard and Bell (1979) demonstrating greater unpredictability of outcome for the moderately impaired is a support for the view that at this stage of our knowledge, selective efforts might best be directed at this group with a view to both prevention and rehabilitation.

This leads naturally to one issue which has not yet been discussed. A major difference between the hospital and home populations used in the present study was the greater level of disability displayed in the former. The degree to which this factor alone influences the effective implementation of RO procedures needs to be examined. We need to establish the impact of physical nursing burden on the acceptance and implementation of non-custodial approaches to care.

The work detailed in this thesis can be criticised on a number of counts. In relation to the sample employed it must be allowed that the subjects in the home comprised a relatively small sample and one that was not as clearly diagnosed as the hospital sample. Although all subjects in the home provided evidence of permanent mental impairment throughout the duration of the study, it is not clear that all were dementing. Some 30% had no diagnosis. The lack of blinding on the behavioural ratings has already been mentioned although, even with hindsight, it is difficult to see how these could have been completed in any other way. In general too, the measures used were extremely specific. For instance, the measure of ward orientation was quite narrowly defined and does not sample behaviour that would be construed in a wider context as demonstrating ward orientation e.g. the ability to follow more complex spatio-temporal directions. In contrast to the approach of this study which looked at a limited range of discrete measures with a large sample of subjects, future evaluative efforts might attempt to employ a wider range of measures on a smaller but precisely classified group of subjects.

In/

In conclusion RO procedures do appear to effect improvements when applied with dementing subjects. The question of whether such changes are clinically significant has not yet been answered. Certainly the impact of RO on staff and the total care environment might be construed as an equally important factor in establishing its overall value. Given the enormity of the task facing authorities wishing to provide better care to the dementing elderly, combined with the lack of obvious effective alternatives in an area characterized by "therapeutic nihilism" we should be satisfied that the results of this investigation provide definite cause for optimism and further development.

1-18 (up to A9)

APPENDICES

Appendix 1

Koskela Test (adapted)

Name: Ward: Date:

		Score			Response
1. **Comprehension** Not administered					
2. **Orientation**					
1. What is the name of this place?		2	1	0	
2. What day of the week is this?		2	1	0	
3. What month is this?		2	1	0	
4. What season is this?		2	1	0	
5. What year is this?		2	1	0	
6. How old are you?		2	1	0	
7. What year were you born in?		2	1	0	
8. When is your birthday?		2	1	0	
9. What is the time?		2	1	0	
10. How long have you been in this hospital?		2	1	0	
	Total:				
3. **Memory**					
1. What are the colours in the British flag?		2	1	0	
2. How many months are there in a year?		2	1	0	
3. What is the capital of Scotland?		2	1	0	
4. Who is the Queen of the United Kingdom?		2	1	0	
5. How many kings or queens of the United Kingdom can you remember in the past?		2	1	0	
6. Who is the Prime Minister of Britain?		2	1	0	
7. What is the population of Scotland?		2	1	0	
8. What year did the First World War begin?		2	1	0	
What year did the First World War end?		2	1	0	
9. What year did the Second World War begin?		2	1	0	
What year did the Second World War end?		2	1	0	
10. How tall is the average British woman?		2	1	0	
	Total:				

4. Paired Associates

(i) knife - fork
East - West
hand - foot

(ii) cup - plate
cat - milk
gold - lead

Number of minutes	Score
0 to 2	0
3 to 9	1
10 to 17	2
18	3

Total:

5. Concentration

		Score				Response
1.	numerals 1-20		2	1	0	
2.	days of the week		2	1	0	
3.	months of the year		2	1	0	
4.	numerals 20-1 backwards	3	2	1	0	
5.	days of the week backwards	3	2	1	0	
6.	months of the year backwards	3	2	1	0	

Total:

Overall Total Score:

Degree of dementia:

Appendix 2

The Extended Orientation Questionnaire

Date	Question	Time (T) Place (PL) Person (P)
	Section 1:	
	1. What is your name?*	P
	2. What is my name?*	P
	3. Who is this person? (person sitting next to)*	P
	4. What's your husband's/son's/daughter's/brother's/sister's name?	P
	5. Who comes to visit you?	P
	6. Where were you born?*	P
	7. How old are you?*	T
	8. What year were you born in?	T
	Section 2:	
	9. Are (were) you married or single?	P
	10. What did you work at?	P
	11. What were you doing before coming to this meeting?	T
	12. What city do you live in now?*	PL
	13. What is the name of this hospital?	PL
	14. Which ward are we in?	PL
	15. What day is it today?*	T
	16. What time is lunch?	T
	Section 3:	
	17. How long have you been at this hospital?	T
	18. What season is it at the moment?	T
	19. Is it morning or afternoon?	T
	20. What's the weather like today?	T
	21. What time is it?	T
	22. What month is it?	T
	23. What year is it?	T

*Quality points awarded (see Appendix 7)

Appendix 3

The Geriatric Rating Scale

			Circle only the number which applies		
AL	1.	When eating, the patient requires:			
		No assistance (feeds himself)	0		
		A little assistance (needs encouragement)		1	
		Considerable assistance(spoon feeding, etc.)			2
AL	2.	The patient is incontinent:			
		Never	0		
		Sometimes (once or twice per week)		1	
		Often (three times per week or more) ..			2
AL	3.	When bathing or dressing, the patient needs:			
		No assistance	0		
		Some assistance		1	
		Maximum assistance			2
AL	4.	The patient will fall from his bed or chair unless protected by side rails:			
		Never	0		
		Sometimes		1	
		Often			2
AL	5.	With regard to walking, the patient:			
		Has no difficulty	0		
		Needs assistance in walking		1	
		Does not walk			2
AL	6.	The patient's vision, with or without glasses is:			
		Apparently normal	0		
		Somewhat impaired		1	
		Extremely poor			2
	7.	The patient's hearing is:			
		Apparently normal	0		
		Somewhat impaired		1	
		Extremely poor			2
N/A	8.	With regard to sleep, the patient:			
		Sleeps most of the night	0		
		Is sometimes awake		1	
		Is often awake			2
	9.	During the day, the patient sleeps:			
		Sometimes	0		
		Often		1	
		Most of the day			2
N/A	10.	With regard to restless behaviour at night, the patient is:			
		Seldom restless	0		
		Sometimes restless		1	
		Often restless			2

			Circle only the number which applies		
N/A	11.	The patient's behaviour is worse at night than in the daytime:			
		Never	0		
		Sometimes		1	
		Often			2
	12.	When not helped by other people, the patient's appearance is:			
		Almost never sloppy	0		
		Sometimes sloppy		1	
		Almost always sloppy			2
AD	13.	The patient masturbates or exposes himself publicly:			
		Never	0		
		Sometimes		1	
		Often			2
AL	14.	The patient is confused (unable to find his way around the ward, loses his possessions etc.): Almost never	0		
		Sometimes		1	
		Often			2
WA	15.	The patient knows the names of:			
		More than one member of the staff ..	0		
		Only one member of the staff		1	
		None of the staff			2
WA	16.	The patient communicates in any manner (by speaking, writing or gesturing) well enough to make himself easily understood:			
		Almost always	0		
		Sometimes		1	
		Almost never			2
WA	17.	The patient reacts to his own name:			
		Almost always	0		
		Sometimes		1	
		Almost never			2
WA	18.	The patient plays games, has hobbies, etc:			
		Often	0		
		Sometimes		1	
		Almost never			2
WA	19.	The patient reads books or magazines on the ward:			
		Often	0		
		Sometimes		1	
		Almost never			2
WA	20.	The patient will begin conversations with others:			
		Often	0		
		Sometimes		1	
		Almost never			2

			Circle only the number which applies		
WA	21.	The patient is willing to do things asked of him:			
		Often	0		
		Sometimes		1	
		Almost never			2
WA	22.	The patient helps with chores on the ward:			
		Often	0		
		Sometimes		1	
		Almost never			2
WA	23.	Without being asked, the patient physically helps other patients:			
		Often	0		
		Sometimes		1	
		Almost never			2
WA	24.	With regard to friends on the ward, the patient:			
		Has several friends	0		
		Has just one friend		1	
		Has no friends			2
WA	25.	The patient talks with other people on the ward:			
		Often	0		
		Sometimes		1	
		Almost never			2
	26.	The patient has a regular work assignment:			
		Away from the ward	0		
		On the ward		1	
		No regular assignment			2
AD	27.	The patient is destructive of materials around him (breaks furniture, tears up magazines, etc.)			
		Never	0		
		Sometimes		1	
		Often			2
AD	28.	The patient disturbs other patients or staff by shouting or yelling			
		Never	0		
		Sometimes		1	
		Often			2
AD	29.	The patient steals from other patients or staff members:			
		Never	0		
		Sometimes		1	
		Often			2

Circle only the number which applies

AD 30. The patient verbally threatens to harm other patients or staff:

Never	0		
Sometimes		1	
Often			2

AD 31. The patient physically tries to harm other patients or staff:

Never	0		
Sometimes		1	
Often			2

Sum AL ....

Sum AD ....

Sum WA ....

Appendix 4.

Ferm's Fields of Behaviour Rating Scale

Field of Behaviour	Scale of Evaluation					
	1	2	3	4	5	6
Ability to move						
Ability to wash						
Ability to dress						
Ability to eat						
Control of the bladder						
Control of the bowels						
Ability to communicate						
Orientation in space						
Recognition of persons						
Participation						
Hobbies						
Sleep						
Quietness						

1. completely independent and adequate performance
2. uncertain performance
3. partial performance, requiring control and slight help
4. partial performance, requiring control and considerable help
5. little spontaneity, requiring virtually constant help
6. complete care necessary

Note:

In participation and hobbies increasing scale values denotes a declining level of activity.

In quietness score 1 indicates constant quietness and score 6 indicates constant disturbed behaviour.

In sleep score 1 = ability to sleep without sleep-inducing drugs, 2 = with temporary use of drugs; 3 = with constant use of sedatives; 4-6 = increasing disturbance of sleep in spite of increasing doses of drugs.

Appendix 5

Ward Social Behaviour and Activity Rating Scale

1. Location	2. Social behaviour	3. Activity level	4. Activity type	5. Interacting with
C Corridor	C Chatting	S Sitting	R Reading	E Study exper.patient
S Corridor seats	L Listening	W Walking	S Sleeping	C Study control pat.
A Activ. room	A Attending/ observing	U Standing upright	W Watching TV	A Auxillary
R RO area	T Touching	O Other	K Knitting	N Staff nurse
D Dayroom	M Manipulating objects		T Tapping to music	S Student nurse
O Other	O Other		D Dancing	V Visitor
	V Verbal		A Adjusting dress	D Domestic
	P Physical viol.		E Examining object	P Other patient
	H Other		O Other (specify)	T 2 patient group
	B Babbling to self		X Not applicable	G 3 patient group
	S Silent/looking ahead			F 4+ patient group
	R Other			I investigator
				O Other
				X Not applicable

Appendix 6

Staff-patient Behaviour Rating Scale

Patient: ....

DATE	TIME	NO. OF STAFF	S.I.	DONE BY (S.P.A.)	INTERACTION TYPE EPV	SNP	SNS	SSP	SEP	SAT	SCB	RTP	SRP	COMMENT

Appendix 7

Scoring Criteria for Extended Orientation Questionnaire

Question:

1. What is your name?

   4 - both names or surname with appropriate prefix
   3 - either Christian or surname only or maiden name
   2 - appropriate, comprehensible but incorrect response or with assistance
   1 - gibberish
   0 - muteness

2. What is my name?

   4 - both names or either name
   3 - name of other project staff or role ("teacher") or with assistance (E or I)
   2 - name of any other staff or role ("nurse" or answering in comprehensible fashion
   1 - gibberish
   0 - muteness

3. Who is person sitting next?

   4 - either Christian or surname or both
   3 - correct with assistance or name of other group member
   2 - querying in comprehensible fashion or general comprehensible response
   1 - gibberish
   0 - muteness

4. What's your relative's name?

   2 - Christian or surname correct
   1 - name of other relative known to us/or relationship, e.g., "I have two cousins".
   0 - any other response

5. Who comes to visit you?

   2 - name of identified visitor or relationship of visitor/nobody if correct
   1 - name of unknown visitor or relative who may conceivably have visited
   0 - wrong response, no response, "nobody" if wrong, "mother"

6. Where were you born?

   3 - correct town or city, area of city or street name or county if rural
   2 - comprehensible yet wrong, e.g., "I don't know", or wrong response
   1 - gibberish
   0 - mute

7. How old are you?

   5 - correct within approx. 1 year
   4 - correct within approx. 6 years if they reply with an age, or correct decade if reply such as "in my seventies" given.
   3 - comprehensible and appropriate response, e.g., "a good age" or says year but can't calculate
   2 - comprehensible and inappropriate, e.g., "42" or "don't know".
   1 - gibberish
   0 - mute

8. What year were you born?

   2 - correct
   1 - correct within 5 years approx. or right decade
   0 - incorrect

9. Are you married or single?

   2 - correct response, or "Yes" or "No" when this is correct
   0 - incorrect response

10. What did you work at?

   2 - correct response
   1 - says where she worked or gives party correct answer
   0 - incorrect response

11. What were you doing before this meeting?

   2 - clearly defined potentially correct response, e.g., "nothing just looking out the window"
   1 - vague, poorly defined response, e.g., "nothing"
   0 - incorrect, confused or no response.

12. What city do you live in now?

   4 - Edinburgh or other definite answers, e.g., "Auld Reekie".
   3 - response implying recognition, e.g, "the Royal City"
   2 - comprehensible yet wrong
   1 - gibberish
   0 - any other response

13. What is the name of this hospital?

   2 - an exact response, e.g., R.E.H. (McKinnon House, East Wing) Greenlea
   1 - a response implying recognition of it being a hospital or home, e.g., "an old people's home" or name of section or ward e,g., Marmion.
   0 - any other response

14. Which ward (section) are we in?

    2 - correct response
    1 - the number/name of another ward/section
    0 - any other response

15. What day is it today?

    4 - correct response
    3 - either/or response one of which is correct, reading off board, correct within one day of day
    2 - any other response, comprehensible
    1 - gibberish

16. What time is lunch (supper)?

    2 - any response between 12 and 1 p.m. or 4 and 5 p.m.
    1 - any response between 11.30 a.m. and 1.30 p.m. or 3.30 p.m. and 6 p.m.; vague response "middle of the day"
    0 - any other response

17. How long have you been at this hospital (home)?

    2 - fairly exact response, say within 20%
    1 - error of 50% allowed or general response "several years"
    0 - greater than 50% error <u>or</u> response denying presence in hospital

18. What season is it at the moment?

    2 - correct response
    1 - inaccurate recognition "it's October - must be winter" or accurate description "the warmest season" (for summer)
    0 - incorrect or no response

19. Is it morning or afternoon?

    2 - definite correct response when question not asked between 11.30 - 12.30 p.m.
    1 - for either answer between 11.30 - 12.30 p.m.
    0 - incorrect.

20. What's the weather like today?

    2 - a reasonably exact description with at least one specific feature mentioned, e.g., "rain", "wind".
    1 - a more generally vague yet reasonably accurate description, e.g., "fine", "not too bad"
    0 - any other response

21. What time is it?

    2 - correct within half hour, even if described by event, e.g., "lunchtime"
    1 - correct within two hours or "I've not got my watch"
    0 - incorrect or no response.

22. What month is it?

2 - correct response
1 - correct within one month either side/exact description of month "the first month of the year"
0 - incorrect or no response

23. What year is it?

2 - correct response
1 - an error of five years or the right decade
0 - any other response

Appendix 8

Ward Social Behaviour and Activity Rating Form

Definitions of Categories

1. Location

   C Corridor - runs from ward door the length of the ward

   S Corridor seats - occur next to the divide for the dayroom on Ward 14 and at the end of the corridor on Ward 16.

   A Activity room - the carpeted area next to the dayroom in 16 only

   R R.O. area - the room on 14 where classroom R.O. is conducted.

   D Dayroom - the large sitting room on both wards.

   O Other (specify)

2. Social behaviour

   (i) Prosocial

   C Chatting - patient must be within 10 ft of the person being addressed, have her head orieted toward that person and be talking.

   L Listening - within 10 ft, head orieted and the other person must be talking.

   A Attending/observing - positive and eye movements indicate that attention is being paid to activities or persons roundabout.

   T Touching - another patient or staff, e.g. holding hands, touching another's arm.

   M Manipulating objects - such that the objects would be available or useful to another person, e.g. passing a magazine, moving a chair.

   O Other - a definable prosocial behaviour not listed above, please specify.

   (ii) Antisocial

   V Verbal harassment - name-calling, threats, berating another about his/her behaviour, telling another person to leave.

   P Physical violence - hitting out, throwing objects or other materials at a person.

   H Other - a definable antisocial behaviour not listed above, please specify.

(iii) Non-social

B Babbling - emitting verbalizations while more than 10 ft from another person, i.e. talking to oneself.

S Silent/looking ahead - looking straight ahead or down at the floor while silent and not attending.

R Other - a definable non-social behaviour which is not listed as an activity under Section 4. Please specify.

3. Activity level

Categories do not require definition.

4. Activity type

T Tapping to music - any rhythmic movement of any part of the body to music.

A Adjusting dress - pulling at dress or undergarments in a purposive fashion. Note - compare with E.

E Examining object - visual or tactile inspection of parts of the environment. This may often be but does not have to be repetitive. The examination may be of personal clothing cf. A above.

O Other - a definable activity not listed, please specify.

X Not applicable - no ongoing activity.

Other categories do not require definition.

5. Interacting with

E Experimental patient - a patient receiving RO treatments. Specify patient number, e.g. E12.

C Control patient - a patient not receiving RO treatments. Specify patient number.

A Auxiliary - nursing auxiliary (assistant), yellow uniform.

P Other patient - a patient not in the study.

T Two patient group - two patients other than the patient being observed.

I Investigator - yourself.

O Other - another person who cannot be identified as belonging to one of the above categories. Please specify.

X Not applicable. Patient not interacting with anyone.

Rules of Observation

1. Before commencing observation on a given session record date and time on each patient's sheet.

2. Allow five minutes on each ward before commencing the first observation round on a given day.

3. Shuffle the patients' sheets between each observation to randomize the order in which patients are observed.

4. Note the behaviour of the patient the exact moment you observe them.

5. Work as quickly as possible and when a patient is temporarily not available reserve her observation until the last. Whenpatient still not available at the end score a line through the sheet for that observation.

6. Alternate observations between the two wards (REH) or delay 15 mins between observations (Greenlea).

7. Only observe between the hours of 9.30 and 11 a.m. and 2.00 and 3.30 p.m. If six observations cannot be compared in a time period denote missing observations by writing MISSING on the record form.

Appendix 9

Summary of ANOVA Tables for one-way analysis of initial test scores
(Note: Tables themselves do not make legible photocopies)

		F Ratio	F. Prob.
Koskela (Orientation)		0.003	0.9556
Koskela (Memory)		0.027	0.8700
Koskela (Concentration)		0.213	0.6460
Koskela (Paired-Assoc.)		0.713	0.4022
Koskela (Total)		0.038	0.8470
G.R.S. (Total)		1.525	0.2226
G.R.S. (ADL)		0.010	0.9213
G.R.S. (W/A)		0.487	0.4914
G.R.S. (A/D)		1.115	0.2960
Ferm's Fields	(F1 + F2 + F3)	0.179	0.6736
- do -	(F4)	0.622	0.4340
- do -	(F5 + F6)	0.281	0.5981
- do -	(F7 + F8 + F9)	0.228	0.6351
- do -	(F10 + F11)	1.106	0.2982
Spatial Orientation		1.073	0.3052
Extended Orientation	(Total)	0.949	0.3346
- do -	(VT, time)	0.569	0.4542
- do -	(VP, place)	4.002	0.0508
- do -	(VR, person)	0.147	0.7034

Note: These analyses were completed at an early stage in the study and at that time, but not in subsequent analyses, it was considered appropriate to group Ferm subscales as above.

Appendix 10

ANOVA Tables for Experiment 1

KEY TO APPENDICES 10 & 11

Koskela Orient.	-	KO
" Concent.	-	KC
" Paired-assoc.	-	KP
" Memory	-	KM
" Total	-	KT
G.R.S. Total	-	GRS
Act. daily living	-	ADL
Anti soc/disrupt.	-	ASD
Withdraw/apathy	-	WAP
Ferm's Fields 1 - 11	-	F1 - F11
" " Total	-	FT
Ward Orientation	-	SO
Extended Orient. Total	-	OT
" " Time	-	VT
" " Place	-	VP
" " Person	-	VR
WSBA scale Prosocial	-	XS
Nonsocial	-	YS
Antisocial	-	QA
Pass. act.	-	VA or PA
Act. act.	-	YA
Total act.	-	TA
Interact. patients	-	1P
Interact. group	-	1G
" staff	-	1S
" others	-	10
" nobody	-	1N
Act. posture	-	AP

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	1564.11333	1	1564.11333	128.16	0.0000
CLASS	20.51577	1	20.51577	1.68	0.2013
PLACE	30.25029	1	30.25029	2.48	0.1223
DEM	694.37732	1	694.37732	56.90	0.0000
CP	1.56125	1	1.56125	0.13	0.7222
CD	7.47081	1	7.47081	0.61	0.4380
PD	0.79655	1	0.79655	0.07	0.7995
CPD	5.12894	1	5.12894	0.42	0.5200
ERROR	561.38690	46	12.20406		
KO	0.63095	1	0.63095	0.12	0.7337
KC	16.50880	1	16.50880	3.07	0.0867
KP	0.74177	1	0.74177	0.14	0.7123
KD	1.00366	1	1.00366	0.19	0.6680
KCP	0.06134	1	0.06134	0.01	0.9155
KCD	22.71424	1	22.71424	4.22	0.0457
KPD	0.00000	1	0.00000	0.00	0.9992
KCPD	0.00018	1	0.00018	0.00	0.9954
ERROR	247.74881	46	5.38584		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4615.67258	1	4615.67258	260.80	0.0000
CLASS	37.02535	1	37.02535	2.09	0.1550
PLACE	195.73151	1	195.73151	11.06	0.0018
DEM	404.74950	1	404.74950	22.87	0.0000
CP	22.47735	1	22.47735	1.27	0.2657
CD	13.19373	1	13.19373	0.75	0.3925
PD	124.62712	1	124.62712	7.04	0.0110
CPD	97.35003	1	97.35003	5.50	0.0235
ERROR	796.40487	45	17.69789		
KC	7.59934	1	7.59934	3.09	0.0856
KC	0.63079	1	0.63079	0.26	0.6150
KP	19.89660	1	19.89660	8.09	0.0067
KD	1.22341	1	1.22341	0.50	0.4843
KCP	1.80694	1	1.80694	0.73	0.3959
KCD	3.90872	1	3.90872	1.59	0.2140
KPD	8.43034	1	8.43034	3.43	0.0707
KCPD	0.13929	1	0.13929	0.06	0.8130
ERROR	110.68626	45	2.45969		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1685.74106	1	1685.74106	96.45	0.0000
CLASS	6.83710	1	6.83710	0.39	0.5348
PLACE	0.08625	1	0.08625	0.00	0.9443
DEM	502.53379	1	502.53379	28.75	0.0000
CP	0.76965	1	0.76965	0.04	0.8347
CD	18.01955	1	18.01955	1.03	0.3153
PD	16.86610	1	16.86610	0.97	0.3312
CPD	76.02750	1	76.02750	4.35	0.0427 .
ERROR	786.46824	45	17.47707		
KP	1.85337	1	1.85337	0.33	0.5697
KC	2.18217	1	2.18217	0.39	0.5374
KP	2.49316	1	2.49316	0.44	0.5099
KD	12.55474	1	12.55474	2.22	0.1430
KCP	0.45603	1	0.45603	0.08	0.7776
KCD	0.86971	1	0.86971	0.15	0.6967
KPD	0.75727	1	0.75727	0.13	0.7160
KCPD	0.01867	1	0.01867	0.00	0.9544
ERROR	254.25395	45	5.65009		

4

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	2334.43628	1	2334.43628	202.09	0.0000
CLASS	0.08642	1	0.08642	0.01	0.9315
PLACE	93.15766	1	93.15766	8.06	0.0067
DEM	737.26456	1	737.26456	63.82	0.0000
CP	8.05192	1	8.05192	0.70	0.4081
CD	0.00931	1	0.00931	0.00	0.9775
PD	8.53377	1	8.53377	0.74	0.3945
CPD	5.98840	1	5.98840	0.52	0.4752
ERROR	531.36726	46	11.55146		
KM	0.18882	1	0.18882	0.05	0.8305
KC	0.04283	1	0.04283	0.01	0.9188
KP	12.82865	1	12.82865	3.15	0.0826
KD	21.54402	1	21.54402	5.29	0.0260
KCP	0.04283	1	0.04283	0.01	0.9188
KCD	0.03368	1	0.03368	0.01	0.9279
KPD	0.50900	1	0.50900	0.12	0.7253
KCPD	4.23441	1	4.23441	1.04	0.3132
ERROR	187.35298	46	4.07289		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT'
MEAN	56015.49232	1	56015.49232	244.70	0.0000
CLASS	0.62317	1	0.62317	0.00	0.9586
PLACE	1294.25327	1	1294.25327	5.65	0.0217
DEM	13518.93977	1	13518.93977	59.06	0.0000
CP	34.73012	1	34.73012	0.15	0.6987
CD	150.80353	1	150.80353	0.66	0.4213
PD	380.49843	1	380.49843	1.66	0.2039
CPD	492.93795	1	492.93795	2.15	0.1492
ERROR	10301.08642	45	228.91303		
KT	10.43743	1	10.43743	0.31	0.5796
KC	68.30949	1	68.30949	2.04	0.1603
KP	113.83155	1	113.83155	3.40	0.0719
KD	125.43435	1	125.43435	3.74	0.0594
KCP	0.26327	1	0.26327	0.01	0.9298
KCD	14.54594	1	14.54594	0.43	0.5134
KPD	23.41190	1	23.41190	0.70	0.4077
KCPD	15.50743	1	15.50743	0.46	0.4999
ERROR	1508.29681	45	33.51771		

LYSIS OF VARIANCE FOR 1-ST
'ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	30666.73981	1	30666.73981	249.62	0.0000
CLASS	132.06720	1	132.06720	1.08	0.3056
PLACE	59.02192	1	59.02192	0.48	0.4920
DEM	311.10105	1	311.10105	2.53	0.1189
CP	61.49591	1	61.49591	0.50	0.4831
CD	3.44866	1	3.44866	0.03	0.8677
PD	71.62980	1	71.62980	0.58	0.4493
CPD	17.02428	1	17.02428	0.14	0.7115
ERROR	5282.65653	43	122.85248		
GRS	25.59579	2	12.79789	0.73	0.4847
GC	4.59045	2	2.29523	0.13	0.8774
GP	2.45137	2	1.22569	0.07	0.9325
GD	5.25237	2	2.62618	0.15	0.8610
GCP	5.21232	2	2.60616	0.15	0.8620
GCD	3.02427	2	1.51214	0.09	0.9174
GPD	23.63570	2	11.81785	0.67	0.5121
GCPD	7.26970	2	3.63485	0.21	0.8131
ERROR	1506.90427	86	17.52214		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1182.39734	1	1182.39734	77.98	0.0000
CLASS	0.28260	1	0.28260	0.02	0.8920
PLACE	3.81648	1	3.81648	0.25	0.6184
DEM	19.20897	1	19.20897	1.27	0.2665
CP	17.71019	1	17.71019	1.17	0.2857
CD	1.45536	1	1.45536	0.10	0.7582
PD	0.39734	1	0.39734	0.03	0.8721
CPD	0.93334	1	0.93334	0.06	0.8052
ERROR	667.19206	44	15.16346		
ADL	3.78548	2	1.89274	1.21	0.3024
AC	2.43410	2	1.21705	0.78	0.4618
AP	1.67789	2	0.83894	0.54	0.5862
AD	6.00894	2	3.00447	1.92	0.1521
ACP	2.51211	2	1.25606	0.80	0.4506
ACD	6.66115	2	3.33057	2.13	0.1245
APD	2.51926	2	1.25963	0.81	0.4496
ACPD	5.85504	2	2.92752	1.88	0.1594
ERROR	137.39365	88	1.56129		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4077.53005	1	4077.53005	184.77	0.0000
CLASS	28.15041	1	28.15041	1.28	0.2650
PLACE	2.58005	1	2.58005	0.12	0.7341
DEM	20.10265	1	20.10265	0.91	0.3452
CP	17.81284	1	17.81284	0.81	0.3740
CD	1.41344	1	1.41344	0.06	0.8014
PD	35.56184	1	35.56184	1.61	0.2111
CPD	7.06783	1	7.06783	0.32	0.5744
ERROR	948.94994	43	22.06860		
~~WAP~~ ASD	1573.37905	2	786.68952	62.02	0.0000
~~W~~C	13.16358	2	6.58179	0.52	0.5970
~~W~~P	2.61753	2	1.30876	0.10	0.9021
~~W~~D	13.14105	2	6.57052	0.52	0.5976
~~W~~CP	33.12829	2	16.56415	1.31	0.2763
~~W~~CD	17.35634	2	8.67817	0.68	0.5073
~~W~~PD	16.41263	2	8.20631	0.65	0.5262
~~W~~CPD	22.40442	2	11.20221	0.88	0.4172

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	8543.00739	1	8543.00739	174.19	0.0000
CLASS	54.96082	1	54.96082	1.12	0.2957
PLACE	0.16237	1	0.16237	0.00	0.9544
DEM	51.74262	1	51.74262	1.06	0.3101
CP	53.50783	1	53.50783	1.09	0.3021
CD	7.91492	1	7.91492	0.16	0.6899
PD	37.30845	1	37.30845	0.76	0.3880
CPD	7.89501	1	7.89501	0.16	0.6902
1 ERROR	2108.92772	43	49.04483		
WAP	13.63453	2	6.81727	0.90	0.4098
WC	2.66720	2	1.33360	0.18	0.8387
WP	11.20875	2	5.60438	0.74	0.4797
WD	0.30740	2	0.15370	0.02	0.9799
WCP	8.56143	2	4.28071	0.57	0.5699
WCD	7.81738	2	3.90869	0.52	0.5983
WPD	15.24203	2	7.62101	1.01	0.3694
WCPD	22.48684	2	11.24342	1.49	0.2319
ERROR	650.48327	86	7.56376		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	516.61599	1	516.61599	80.83	0.0000
CLASS	2.92830	1	2.92830	0.46	0.5019
PLACE	4.76786	1	4.76786	0.75	0.3923
DEM	7.94873	1	7.94873	1.24	0.2707
CP	8.53270	1	8.53270	1.34	0.2540
CD	7.84663	1	7.84663	1.23	0.2737
PD	7.64440	1	7.64440	1.20	0.2799
CPD	16.08839	1	16.08839	2.52	0.1196
ERROR	287.61270	45	6.39139		
F2	2.12007	2	1.06004	0.98	0.3810
FC	0.54234	2	0.27117	0.25	0.7797
FP	1.26729	2	0.63364	0.58	0.5603
FD	1.94088	2	0.97044	0.89	0.4131
FCP	1.69173	2	0.84587	0.78	0.4623
FCD	3.31336	2	1.65668	1.52	0.2233
FPD	4.14364	2	2.07182	1.91	0.1546
FCPD	3.23673	2	1.61836	1.49	0.2311
ERROR	97.81582	90	1.08684		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	251.33000	1	251.33000	42.87	0.0000
CLASS	0.59047	1	0.59047	0.10	0.7524
PLACE	0.23525	1	0.23525	0.04	0.8421
DEM	3.25396	1	3.25396	0.56	0.4601
CP	2.34514	1	2.34514	0.40	0.5303
CD	0.57383	1	0.57383	0.10	0.7558
PD	8.31129	1	8.31129	1.42	0.2400
CPD	0.00003	1	0.00003	0.00	0.9982
ERROR	263.79524	45	5.86212		
F1	1.00760	2	0.50380	0.77	0.4665
FC	0.31084	2	0.15542	0.24	0.7893
FP	0.15402	2	0.07701	0.12	0.8892
FD	1.11037	2	0.55518	0.85	0.4319
FCP	0.92563	2	0.46282	0.71	0.4961
FCD	0.03582	2	0.01791	0.03	0.9730
FPD	0.10947	2	0.05474	0.08	0.9177
FCPD	0.31084	2	0.15542	0.24	0.7893
ERROR	58.96170	90	0.65513		

LYSIS OF VARIANCE FUR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	823.60428	1	823.60428	110.84	0.0000
CLASS	21.59312	1	21.59312	2.91	0.0951
PLACE	9.85376	1	9.85376	1.33	0.2556
DEM	15.22590	1	15.22590	2.05	0.1592
CP	42.57817	1	42.57817	5.73	0.0209
CD	8.32176	1	8.32176	1.12	0.2956
PD	7.60428	1	7.60428	1.02	0.3171
CPD	12.19049	1	12.19049	1.64	0.2068
ERROR	334.37460	45	7.43055		
F3	0.76525	2	0.38263	0.44	0.6454
FC	1.21280	2	0.60640	0.70	0.5006
FP	0.78842	2	0.39421	0.45	0.6370
FD	0.17719	2	0.08860	0.10	0.9032
FCP	0.39288	2	0.19644	0.23	0.7983
FCD	0.48297	2	0.24148	0.28	0.7562
FPD	1.25174	2	0.62587	0.72	0.4897
FCPD	0.59880	2	0.29940	0.34	0.7096
ERROR	78.26349	90	0.86959		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	160.45517	1	160.45517	56.05	0.0000
CLASS	0.07131	1	0.07131	0.02	0.8753
PLACE	1.24004	1	1.24004	0.43	0.5138
DEM	5.68910	1	5.68910	1.99	0.1655
CP	1.84143	1	1.84143	0.64	0.4268
CD	0.02854	1	0.02854	0.01	0.9209
PD	2.99709	1	2.99709	1.05	0.3117
CPD	3.21476	1	3.21476	1.12	0.2949
ERROR	128.82698	45	2.86282		
F4	0.16205	2	0.08102	0.23	0.7920
FC	0.00596	2	0.00298	0.01	0.9914
FP	0.38104	2	0.19052	0.55	0.5791
FD	0.10245	2	0.05123	0.15	0.8628
FCP	0.02259	2	0.01130	0.03	0.9679
FCD	0.61719	2	0.30859	0.89	0.4141
FPD	0.20224	2	0.10112	0.29	0.7477
FCPD	0.06001	2	0.03001	0.09	0.9172
ERROR	31.19683	90	0.34663		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	486.75387	1	486.75387	63.62	0.0000
CLASS	9.59319	1	9.59319	1.25	0.2687
PLACE	0.34856	1	0.34856	0.05	0.8319
DEM	1.20788	1	1.20788	0.16	0.6930
CP	3.26709	1	3.26709	0.43	0.5168
CD	6.33015	1	6.33015	0.83	0.3679
PD	0.10106	1	0.10106	0.01	0.9090
CPD	0.04364	1	0.04364	0.01	0.9401
ERROR	344.27778	45	7.65062		
F5	1.97201	2	0.98600	1.21	0.3025
FC	1.55324	2	0.77662	0.95	0.3889
FP	0.11596	2	0.05798	0.07	0.9313
FD	2.12982	2	1.06491	1.31	0.2753
FCP	1.14932	2	0.57466	0.71	0.4963
FCD	0.56858	2	0.28429	0.35	0.7061
FPD	0.51255	2	0.25627	0.31	0.7307
FCPD	2.13397	2	1.06699	1.31	0.2746
ERROR	73.24127	90	0.81379		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	413.36126	1	413.36126	54.32	0.0000
CLASS	1.79733	1	1.79733	0.24	0.6293
PLACE	5.76736	1	5.76736	0.76	0.3886
DEM	0.13465	1	0.13465	0.02	0.8948
CP	0.61586	1	0.61586	0.08	0.7774
CD	5.13977	1	5.13977	0.68	0.4155
PD	0.56016	1	0.56016	0.07	0.7874
CPD	0.33371	1	0.33371	0.04	0.8351
ERROR	342.46984	45	7.61044		
F6	1.82656	2	0.91328	1.05	0.3533
FC	0.03221	2	0.01611	0.02	0.9816
FP	2.03703	2	1.01852	1.17	0.3139
FD	1.91922	2	0.95961	1.11	0.3354
FCP	0.16111	2	0.08056	0.09	0.9114
FCD	0.39812	2	0.19906	0.23	0.7955
FPD	1.37611	2	0.68805	0.79	0.4556
FCPD	0.08627	2	0.04313	0.05	0.9515
ERROR	78.09206	90	0.86769		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	437.48868	1	437.48868	91.32	0.0000
CLASS	2.94075	1	2.94075	0.61	0.4375
PLACE	3.59679	1	3.59679	0.75	0.3908
DEM	28.40760	1	28.40760	5.93	0.0189
CP	12.75503	1	12.75503	2.66	0.1097
CD	0.77305	1	0.77305	0.16	0.6898
PD	4.94399	1	4.94399	1.03	0.3151
CPD	14.08559	1	14.08559	2.94	0.0933
ERROR	215.59365	45	4.79097		
F7	2.03219	2	1.01610	0.82	0.4423
FC	0.58112	2	0.29056	0.24	0.7908
FP	1.49284	2	0.74642	0.60	0.5485
FD	0.69451	2	0.34725	0.28	0.7555
FCP	2.37421	2	1.18710	0.96	0.3862
FCD	0.16492	2	0.08246	0.07	0.9354
FPD	0.90122	2	0.45061	0.37	0.6952
FCPD	0.36767	2	0.18384	0.15	0.8618
ERROR	111.10159	90	1.23446		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1080.99462	1	1080.99462	196.78	0.0000
CLASS	0.00027	1	0.00027	0.00	0.9945
PLACE	8.24856	1	8.24856	1.50	0.2268
DEM	39.48349	1	39.48349	7.19	0.0102
CP	12.05135	1	12.05135	2.19	0.1455
CD	0.11788	1	0.11788	0.02	0.8842
PD	0.69525	1	0.69525	0.13	0.7237
CFD	0.55744	1	0.55744	0.10	0.7515
ERROR	247.20476	45	5.49344		
F8	5.49369	2	2.74685	1.98	0.1440
FC	1.09809	2	0.54904	0.40	0.6743
FP	0.83554	2	0.41777	0.30	0.7407
FD	2.04968	2	1.02484	0.74	0.4805
FCP	1.09215	2	0.54607	0.39	0.6757
FCD	1.33331	2	0.66666	0.48	0.6199
FPD	1.88455	2	0.94227	0.68	0.5095
FCPD	1.00661	2	0.50331	0.36	0.6967
ERROR	124.81905	90	1.38688		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	687.80969	1	687.80969	116.42	0.0000
CLASS	6.34844	1	6.34844	1.07	0.3055
PLACE	6.90958	1	6.90958	1.17	0.2853
DEM	21.74534	1	21.74534	3.68	0.0614
CP	28.97193	1	28.97193	4.90	0.0319
CD	7.59426	1	7.59426	1.29	0.2629
PD	9.50338	1	9.50338	1.61	0.2112
CPD	28.77672	1	28.77672	4.87	0.0325
ERROR	265.85873	45	5.90797		
F9	0.39118	2	0.19559	0.14	0.8730
FC	1.93261	2	0.96630	0.67	0.5131
FP	3.57225	2	1.78612	1.24	0.2936
FD	3.23545	2	1.61772	1.13	0.3291
FCP	0.56957	2	0.28479	0.20	0.8206
FCD	3.24871	2	1.62436	1.13	0.3276
FPD	1.15486	2	0.57743	0.40	0.6704
FCPD	1.80371	2	0.90185	0.63	0.5363
ERROR	129.38413	90	1.43760		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1217.14690	1	1217.14690	211.36	0.0000
CLASS	6.60735	1	6.60735	1.15	0.2898
PLACE	5.44905	1	5.44905	0.95	0.3359
DEM	26.71031	1	26.71031	4.64	0.0367
CP	0.98018	1	0.98018	0.17	0.6819
CD	4.79169	1	4.79169	0.83	0.3665
PD	3.81357	1	3.81357	0.66	0.4201
CPD	0.02384	1	0.02384	0.00	0.9490
ERROR	259.13492	45	5.75855		
F10	3.42495	2	1.71248	1.27	0.2859
FC	2.59256	2	1.29628	0.96	0.3863
FP	0.50089	2	0.25044	0.19	0.8308
FD	0.48703	2	0.24351	0.18	0.8351
FCP	0.69255	2	0.34628	0.26	0.7741
FCD	1.11390	2	0.55695	0.41	0.6629
FPD	8.63355	2	4.31677	3.20	0.0454
FCPD	1.51702	2	0.75851	0.56	0.5718
ERROR	121.37460	90	1.34861		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1868.93972	1	1868.93972	434.28	0.0000
CLASS	6.12165	1	6.12165	1.42	0.2392
PLACE	2.99081	1	2.99081	0.69	0.4089
DEM	25.10169	1	25.10169	5.83	0.0199
CP	2.06997	1	2.06997	0.48	0.4915
CD	3.97850	1	3.97850	0.92	0.3414
PD	0.14277	1	0.14277	0.03	0.8563
CPD	0.03849	1	0.03849	0.01	0.9251
ERROR	193.66032	45	4.30356		
F11	4.09948	2	2.04974	1.35	0.2634
FC	2.33919	2	1.16960	0.77	0.4648
FP	3.35401	2	1.67701	1.11	0.3347
FD	3.64230	2	1.82115	1.20	0.3051
FCP	2.69500	2	1.34750	0.89	0.4142
FCD	4.99853	2	2.49927	1.65	0.1976
FPD	1.64903	2	0.82452	0.54	0.5819
FCPD	1.21653	2	0.60827	0.40	0.6703
ERROR	136.24444	90	1.51383		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	78859.62247	1	78859.62247	212.95	0.0000
CLASS	0.30900	1	0.30900	0.00	0.9771
PLACE	58.10123	1	58.10123	0.16	0.6939
DEM	1195.81987	1	1195.81987	3.23	0.0790
CP	592.90241	1	592.90241	1.60	0.2123
CD	99.67995	1	99.67995	0.27	0.6064
PD	346.43605	1	346.43605	0.94	0.3386
CPD	371.76846	1	371.76846	1.00	0.3217
ERROR	16664.06984	45	370.31266		
FT	89.73310	2	44.86655	1.66	0.1954
FC	16.17774	2	8.08887	0.30	0.7417
FP	23.58876	2	11.79438	0.44	0.6473
FD	49.81191	2	24.90595	0.92	0.4011
FCP	2.69750	2	1.34875	0.05	0.9513
FCD	83.69542	2	41.84771	1.55	0.2177
FPD	74.45382	2	37.22691	1.38	0.2570
FCPD	4.13616	2	2.06808	0.08	0.9263
ERROR	2428.66349	90	26.98515		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3232.06084	1	3232.06084	290.81	0.0000
CLASS	43.90476	1	43.90476	3.95	0.0537
PLACE	261.48839	1	261.48839	23.53	0.0000
DEM	336.24045	1	336.24045	30.25	0.0000
CP	2.62615	1	2.62615	0.24	0.6295
CD	4.42794	1	4.42794	0.40	0.5315
PD	7.46050	1	7.46050	0.67	0.4175
CPD	0.06314	1	0.06314	0.01	0.9403
ERROR	444.55798	40	11.11395		
S0	0.76746	2	0.38373	0.09	0.9178
SC	10.92334	2	5.46167	1.22	0.2999
SP	23.24188	2	11.62094	2.60	0.0804
SD	32.04968	2	16.02484	3.59	0.0322
SCP	50.36314	2	25.18157	5.64	0.0051
SCD	28.58420	2	14.29210	3.20	0.0461
SPD	10.33743	2	5.16871	1.16	0.3196
SCPD	14.19590	2	7.09795	1.59	0.2105
ERROR	357.38608	80	4.46733		

ALYSIS OF VARIANCE FOR 1-ST
'ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	74725.21311	1	74725.21311	427.05	0.0000
CLASS	329.18621	1	329.18621	1.88	0.1768
PLACE	1228.63043	1	1228.63043	7.02	0.0110
DEM	6332.37127	1	6332.37127	36.19	0.0000
CP	54.21297	1	54.21297	0.31	0.5805
CD	7.52851	1	7.52851	0.04	0.8366
PD	27.09219	1	27.09219	0.15	0.6958
CPD	7.13409	1	7.13409	0.04	0.8409
ERROR	8049.10104	46	174.98046		
OT	104.14883	2	52.07442	4.40	0.0150
OC	19.10267	2	9.55133	0.81	0.4493
OP	16.56671	2	8.28336	0.70	0.4993
OD	49.77198	2	24.88599	2.10	0.1280
OCP	31.16370	2	15.58185	1.32	0.2731
OCD	42.95107	2	21.47553	1.81	0.1687
OPD	1.51649	2	0.75824	0.06	0.9380
OCPD	2.96710	2	1.48355	0.13	0.8823
ERROR	1088.88706	92	11.83573		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	10311.01459	1	10311.01459	298.31	0.0000
CLASS	16.92042	1	16.92042	0.49	0.4877
PLACE	246.91265	1	246.91265	7.14	0.0104
DEM	1760.18918	1	1760.18918	50.92	0.0000
CP	40.82879	1	40.82879	1.18	0.2828
CD	1.53861	1	1.53861	0.04	0.8335
PD	0.12117	1	0.12117	0.00	0.9530
CPD	3.94830	1	3.94830	0.11	0.7369
ERROR	1589.99023	46	34.56501		
VT	35.28938	2	17.64469	3.18	0.0460
VC	14.83481	2	7.41740	1.34	0.2673
VP	0.37117	2	0.18558	0.03	0.9671
VD	7.76472	2	3.88236	0.70	0.4990
VCP	42.99011	2	21.49505	3.88	0.0241
VCD	5.26792	2	2.63396	0.48	0.6232
VPD	3.08766	2	1.54383	0.28	0.7575
VCPD	1.28215	2	0.64107	0.12	0.8909
ERROR	509.88889	92	5.54227		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3126.95318	1	3126.95318	342.60	0.0000
CLASS	60.53982	1	60.53982	6.63	0.0133
PLACE	40.68571	1	40.68571	4.46	0.0402
DEM	202.93193	1	202.93193	22.23	0.0000
CP	0.29312	1	0.29312	0.03	0.8586
CD	0.00002	1	0.00002	0.00	0.9987
PD	10.18707	1	10.18707	1.12	0.2963
CPD	0.00742	1	0.00742	0.00	0.9774
ERROR	419.84982	46	9.12717		
VP	1.97860	2	0.98930	0.40	0.6720
VC	4.42651	2	2.21326	0.89	0.4128
VP	8.22197	2	4.11098	1.66	0.1959
VD	2.40081	2	1.20040	0.48	0.6176
VCP	5.18104	2	2.59052	1.05	0.3557
VCD	3.34076	2	1.67038	0.67	0.5121
VPD	2.75516	2	1.37758	0.56	0.5754
VCPD	4.35385	2	2.17692	0.88	0.4188
ERROR	227.95421	92	2.47776		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	13485.53288	1	13485.53288	399.74	0.0000
CLASS	36.22692	1	36.22692	1.07	0.3055
PLACE	182.09451	1	182.09451	5.40	0.0246
DEM	529.84063	1	529.84063	15.71	0.0003
CP	4.19847	1	4.19847	0.12	0.7259
CD	3.48275	1	3.48275	0.10	0.7494
PD	7.66364	1	7.66364	0.23	0.6359
CPD	0.03643	1	0.03643	0.00	0.9739
ERROR	1551.85379	46	33.73595		
VR	12.54796	2	6.27398	1.31	0.2737
VC	1.96542	2	0.98271	0.21	0.8143
VP	0.20925	2	0.10462	0.02	0.9783
VD	13.26578	2	6.63289	1.39	0.2544
VCP	4.74563	2	2.37281	0.50	0.6099
VCD	12.52852	2	6.26426	1.31	0.2742
VPD	0.41781	2	0.20891	0.04	0.9572
VCPD	11.30676	2	5.65338	1.18	0.3106
ERROR	439.18559	92	4.77376		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	8Ø431.24166	1	8Ø431.24166	1Ø3.14	Ø.ØØØØ
CLASS	3241.369Ø2	1	3241.369Ø2	4.16	Ø.Ø47Ø
PLACE	7789.69469	1	7789.69469	9.99	Ø.ØØ27
CP	Ø.Ø7252	1	Ø.Ø7252	Ø.ØØ	Ø.9923
ERROR	37431.269Ø1	48	779.8181Ø		
XS ns	2295.65Ø2Ø	2	1147.8251Ø	3.63	Ø.Ø3Ø2
XC	13.578Ø8	2	6.789Ø4	Ø.Ø2	Ø.9786
XP	2139.6944Ø	2	1Ø69.8472Ø	3.38	Ø.Ø38Ø
XCP	15Ø8.42155	2	754.21Ø77	2.39	Ø.Ø974
ERROR	3Ø345.27924	96	316.Ø9666		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	659683.37311	1	659683.37311	831.72	Ø.ØØØØ
CLASS	2992.12449	1	2992.12449	3.77	Ø.Ø58Ø
PLACE	7891.8372Ø	1	7891.8372Ø	9.95	Ø.ØØ28
CP	Ø.94217	1	Ø.94217	Ø.ØØ	Ø.9726
ERROR	38Ø71.32675	48	793.15264		
YS ns	2443.79333	2	1221.89666	3.97	Ø.Ø221
YC	25.795Ø7	2	12.89754	Ø.Ø4	Ø.959Ø
YP	222Ø.9867Ø	2	111Ø.49335	3.61	Ø.Ø3Ø9
YCP	1399.85Ø32	2	699.92516	2.27	Ø.1Ø85
ERROR	29552.91667	96	3Ø7.84288		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1.95638	1	1.95638	Ø.72	Ø.3988
CLASS	1.95638	1	1.95638	Ø.72	Ø.3988
PLACE	1.95638	1	1.95638	Ø.72	Ø.3988
CP	1.95638	1	1.95638	Ø.72	Ø.3988
ERROR	129.57895	48	2.69956		
GA ns	3.91277	2	1.95638	Ø.72	Ø.4871
GC	3.91277	2	1.95638	Ø.72	Ø.4871
GP	3.91277	2	1.95638	Ø.72	Ø.4871
GCP	3.91277	2	1.95638	Ø.72	Ø.4871
ERROR	259.15789	96	2.69956		

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	15939.93318	1	15939.93318	95.39	0.0000
CLASS	31.66295	1	31.66295	0.19	0.6653
PLACE	9006.59985	1	9006.59985	53.90	0.0000
CP	377.18045	1	377.18045	2.26	0.1395
ERROR	8020.69883	48	167.09789		
VA PA	571.80048	2	285.90024	2.94	0.0578
VC	1961.59325	2	980.79663	10.07	0.0001
VP	1664.60343	2	832.30171	8.55	0.0004
VCP	894.97078	2	447.48539	4.60	0.0124
ERROR	9346.21784	96	97.35644		

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1746.94196	1	1746.94196	16.95	0.0002
CLASS	72.81072	1	72.81072	0.71	0.4048
PLACE	17.43919	1	17.43919	0.17	0.6826
CP	25.60630	1	25.60630	0.25	0.6204
ERROR	4946.53216	48	103.05275		
YA PA	161.48125	2	60.74063	1.20	0.3048
YC	92.38481	2	46.19240	0.69	0.5049
YP	885.28236	2	442.64118	6.59	0.0021
YCP	166.28536	2	83.14268	1.24	0.2944
ERROR	6443.73538	96	67.12224		

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	28240.76316	1	28240.76316	96.24	0.0000
CLASS	8.44446	1	8.44446	0.03	0.8660
PLACE	9816.67476	1	9816.67476	33.45	0.0000
CP	206.23452	1	206.23452	0.70	0.4060
ERROR	14084.67544	48	293.43074		
TA	1318.99120	2	659.49560	3.32	0.0402
TC	1791.79434	2	895.89717	4.52	0.0134
TP	4207.14590	2	2103.57295	10.60	0.0001
TCP	1092.28053	2	546.14027	2.75	0.0688
ERROR	19045.04825	96	198.38592		

NALYSIS OF VARIANCE FOR 1-ST
EPENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	18293.26679	1	18293.26679	47.95	0.0000
CLASS	527.62794	1	527.62794	1.38	0.2454
PLACE	1349.84138	1	1349.84138	3.54	0.0660
CP	34.76607	1	34.76607	0.09	0.7640
ERROR	18311.73860	48	381.49872		
IG	679.09831	2	339.54915	1.74	0.1816
IC	45.57577	2	22.78789	0.12	0.8901
IP	791.80549	2	395.90275	2.02	0.1376
ICP	1635.80782	2	817.90391	4.18	0.0181
ERROR	18772.39912	96	195.54582		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	98.71707	1	98.71707	4.18	0.0463
CLASS	4.10352	1	4.10352	0.17	0.6786
PLACE	39.31375	1	39.31375	1.67	0.2030
CP	2.68915	1	2.68915	0.11	0.7372
ERROR	1132.94737	48	23.60307		
IG	17.99593	2	8.99796	0.52	0.5933
IC	41.37017	2	20.68508	1.21	0.3036
IP	15.87438	2	7.93719	0.46	0.6307
ICP	6.71823	2	3.35912	0.20	0.8224
ERROR	1645.47368	96	17.14035		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	1945.11856	1	1945.11856	45.37	0.0000
CLASS	193.06079	1	193.06079	4.50	0.0372
PLACE	157.75944	1	157.75944	3.68	0.0610
CP	3.34440	1	3.34440	0.08	0.7812
ERROR	2058.07602	48	42.87658		
IG	129.56185	2	64.78092	1.35	0.2633
IC	264.12151	2	132.06075	2.74	0.0694
IP	331.72759	2	165.86380	3.44	0.0359
ICP	85.44011	2	42.72005	0.89	0.4151
ERROR	4622.37573	96	48.14975		

HALYSIS OF VARIANCE FOR 1-ST
:PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	3058.22237	1	3058.22237	19.31	0.0001
CLASS	341.08793	1	341.08793	2.15	0.1488
PLACE	764.88903	1	764.88903	4.83	0.0328
CP	6.03084	1	6.03084	0.04	0.8461
ERROR	7602.67251	48	158.38901		
ID	445.46880	2	222.73440	2.34	0.1015
IC	110.14613	2	55.07306	0.58	0.5622
IP	175.64191	2	87.82095	0.92	0.4005
ICP	36.42974	2	18.21487	0.19	0.8257
ERROR	9125.14766	96	95.05362		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	724613.16436	1	724613.16436	1134.34	0.0000
CLASS	2815.62476	1	2815.62476	4.41	0.0411
PLACE	3378.71868	1	3378.71868	5.29	0.0259
CP	16.47927	1	16.47927	0.03	0.8731
ERROR	30662.33918	48	638.79873		
IN	1283.31163	2	641.65581	2.13	0.1246
IC	8.39237	2	4.19619	0.01	0.9862
IP	2788.40924	2	1394.20462	4.62	0.0121

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 AD3

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	25887.98901	1	25887.98901	19.83	0.0001
CLASS	135.85991	1	135.85991	0.10	0.7483
PLACE	5398.18423	1	5398.18423	4.14	0.0475
CP	827.24849	1	827.24849	0.63	0.4298
ERROR	62621.19006	48	1304.60813		
AP	983.06791	2	491.53395	2.89	0.0602
AC	182.66663	2	91.33331	0.54	0.5857
AR	1037.42518	2	518.71259	3.05	0.0517
ACP	420.31672	2	210.15836	1.24	0.2946
ERROR	16300.84942	96	169.80051		

Appendix 11

Breakdown ANOVA Tables for Experiment 1

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 KO (mild dements)

SOURCE	F	TAIL PROBABILITY	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
MEAN	172.22	0.0000	3817.03858	1	3817.03858
CLASS	2.21	0.1517	49.05109	1	49.05109
PLACE	1.49	0.2352	33.09698	1	33.09698
CP	0.55	0.4652	12.26277	1	12.26277
ERROR			465.42857	21	22.16327
KO	0.39	0.5404	2.97873	1	2.97873
KC	12.44	0.0020	95.65026	1	95.65026
KP	0.07	0.7962	0.52617	1	0.52617
KCP	0.41	0.5288	3.15391	1	3.15391
ERROR			161.45714	21	7.68844

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 KO (severe dements)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	59.50208	1	59.50208	17.28	0.0004
CLASS	1.10208	1	1.10208	0.32	0.5771
PLACE	7.25208	1	7.25208	2.11	0.1602
CP	0.35208	1	0.35208	0.10	0.7520
ERROR	79.20833	23	3.44384		
KO	1.10208	1	1.10208	0.63	0.4372
KC	0.16875	1	0.16875	0.10	0.7598
KP	0.25208	1	0.25208	0.14	0.7088
KCP	0.01875	1	0.01875	0.01	0.9187
ERROR	40.54167	23	1.76268		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD2 AD3

VT (Home)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4329.64923	1	4329.64923	120.86	0.0000
CLASS	1.63168	1	1.63168	0.05	0.8346
DEM	563.52642	1	563.52642	15.73	0.0019
CD	0.17554	1	0.17554	0.00	0.9433
ERROR	429.89683	12	35.82474		
VT	12.98517	2	6.49257	1.20	0.3199
VC	31.58166	2	15.79083	2.91	0.0740
VD	1.81850	2	0.90925	0.17	0.8468
VCD	2.48517	2	1.24257	0.23	0.7972
ERROR	130.31746	24	5.42989		

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VT (Home - Occ 1 - Occ 2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3042.23825	1	3042.23825	99.72	0.0000
CLASS	1.02773	1	1.02773	0.03	0.8574
DEM	356.68562	1	356.68562	11.69	0.0051
CD	0.31720	1	0.31720	0.01	0.9205
ERROR	366.10714	12	30.50893		
VT	6.84226	1	6.84226	0.99	0.3405
VC	31.57910	1	31.57910	4.55	0.0543
VD	1.07910	1	1.07910	0.16	0.7004
VCD	0.02647	1	0.02647	0.00	0.9516
ERROR	83.34524	12	6.94544		

VT (Home 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	2950.43860	1	2950.43860	148.97	0.0000
CLASS	3.07018	1	3.07018	0.16	0.7007
DEM	406.03070	1	406.03070	20.50	0.0007
CD	0.76754	1	0.76754	0.04	0.8472
ERROR	237.66667	12	19.80556		
VT	11.93233	1	11.93233	5.54	0.0365
VC	[illegible]	1	[illegible]	[illegible]	0.0757
VD					0.66?6
VCD	1 62970	1	1.62970	0.76	0.4015
ERROR	25.85714	12	2.15476		

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ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 AD3 VT (Hospital)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	8935.38203	1	8935.38203	261.88	0.0000
CLASS	133.81032	1	133.81032	3.92	0.0558
DEM	2099.76224	1	2099.76224	61.54	0.0000
CD	12.63466	1	12.63466	0.37	0.5469
ERROR	1160.09341	34	34.12039		
VT	36.49290	2	18.24645	3.27	0.0441
VC	18.63108	2	9.31554	1.67	0.1961
VD	19.32244	2	9.66122	1.73	0.1849
VCD	6.31746	2	3.15873	0.57	0.5705
ERROR	379.57143	68	5.58193		

VT (Hospital 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6361.40659	1	6361.40659	279.23	0.0000
CLASS	124.72772	1	124.72772	5.47	0.0251
DEM	1481.90720	1	1481.90720	65.05	0.0000
CD	16.02198	1	16.02198	0.70	0.4074
ERROR	797.35714	35	22.78163		
VT	23.93407	1	23.93407	4.30	0.0455
VC	9.69231	1	9.69231	1.74	0.1955
VD	17.23077	1	17.23077	3.10	0.0872
VCD	3.16484	1	3.16484	0.57	0.4558
ERROR	194.78571	35	5.56531		

VT (Hospital 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6178.70603	1	6178.70603	304.07	0.0000
CLASS	49.32591	1	49.32591	2.43	0.1283
DEM	1521.37269	1	1521.37269	74.87	0.0000
CD	10.64636	1	10.64636	0.53	0.4720
ERROR	690.88462	34	20.32014		
VT	30.41993	1	30.41993	5.77	0.0219
VC	1.03721	1	1.03721	0.20	0.6603
VD	11.73507	1	11.73507	2.22	0.1450
VCD	5.85852	1	5.85852	1.11	0.2994
ERROR	179.34615	34	5.27469		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 AD3 SO (Home)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1682.16068	1	1682.16068	186.22	0.0000
CLASS	7.90427	1	7.90427	0.88	0.3769
DEM	76.82735	1	76.82735	8.50	0.0194
CD	1.75043	1	1.75043	0.19	0.6714
ERROR	72.26667	8	9.03333		
SO	4.93675	2	2.46838	1.08	0.3628
SC	26.68034	2	13.34017	5.84	0.0124
SD	8.21880	2	4.10940	1.80	0.1972
SCD	25.85983	2	12.92991	5.66	0.0138
ERROR	36.53333	16	2.28333		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 SO (Home, 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1293.05833	1	1293.05833	159.75	0.0000
CLASS	0.34405	1	0.34405	0.04	0.8409
DEM	49.05833	1	49.05833	6.05	0.0337
CD	2.20119	1	2.20119	0.27	0.6137
ERROR	81.06667	10	8.10667		
SO	0.00119	1	0.00119	0.00	0.9840
SC	7.42976	1	7.42976	2.63	0.1360
SD	4.42976	1	4.42976	1.57	0.2391
SCD	2.00119	1	2.00119	0.71	0.4190
ERROR	28.26667	10	2.82667		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD2 AD3 SO (Home, 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	[illegible]	1	[illegible]	245.88	0.0000
CLASS	40.92256	1	40.92256	9.48	[illegible]
ERROR	34.60000	8	4.32500		
SO	2.62564	1	2.62564	2.84	0.1305
SC	6.93333	1	6.93333	7.50	0.0255
SD	5.90769	1	5.90769	6.39	0.0354
SCD	11.85641	1	11.85641	12.82	0.0072
ERROR	7.40000	8	0.92500		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD1 AD2 AD3 SO (Hospital)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1993.49442	1	1993.49442	171.35	0.0000
CLASS	81.92009	1	81.92009	7.04	0.0123
DEM	534.68378	1	534.68378	45.96	0.0000
CD	4.13605	1	4.13605	0.36	0.5552
ERROR	372.29131	32	11.63410		
SO	38.99258	2	19.49629	3.89	0.0255
SC	45.77506	2	22.88753	4.57	0.0140
SD	70.73593	2	35.36797	7.05	0.0017
SCD	4.32279	2	2.16139	0.43	0.6516
ERROR	320.85275	64	5.01332		
4					

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD2 SO (Hospital, 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	1124.87844	1	1124.87844	104.41	0.0000
CLASS	117.25230	1	117.25230	10.88	0.0023
DEM	189.29857	1	189.29857	17.57	0.0002
CD	0.01983	1	0.01983	0.00	0.9680
ERROR	355.52662	33	10.77353		
SO	3.79102	1	3.79102	0.99	0.3273
SC	3.05560	1	3.05560	0.80	0.3789
SD	1.07637	1	1.07637	0.28	0.6001
SCD	0.56737	1	0.56737	0.15	0.7032
ERROR	126.77857	33	3.84177		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD2 AD3 SO (Hosp. 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	1523.75859	1	1523.75859	156.12	0.0000
CLASS	65.11689	1	65.11689	6.67	0.0144
DEM	409.12726	1	409.12726	41.92	0.0000
CD	0.43804	1	0.43804	0.04	0.8335
ERROR	322.08725	33	9.76022		
SO	21.19332	1	21.19332	3.28	0.0794
SC	48.20414	1	48.20414	7.45	0.0101
SD	65.08589	1	65.08589	10.06	0.0033
SCD	4.92545	1	4.92545	0.76	0.3892
ERROR	213.47985	33	6.46909		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD2 AD3

SO (mild dements)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM.	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	4386.31489	1	4386.31489	342.86	0.0000
CLASS	15.86444	1	15.86444	1.24	0.2810
PLACE	140.13591	1	140.13591	10.95	0.0041
CP	2.71649	1	2.71649	0.21	0.6507
ERROR	217.48571	17	12.79328		
SO	30.31214	2	15.15607	2.12	0.1350
SC	16.76259	2	8.38130	1.18	0.3210
SP	48.57040	2	24.28520	3.40	0.0449
SCP	9.84367	2	4.92184	0.69	0.5084
ERROR	242.51429	34	7.13277		

SO (severe dements)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	547.12900	1	547.12900	55.42	0.0000
CLASS	28.11292	1	28.11292	2.85	0.1050
PLACE	131.78308	1	131.78308	13.35	0.0013
CP	0.69154	1	0.69154	0.07	0.7936
ERROR	227.07226	23	9.87271		
SO	9.79906	2	4.89953	1.96	0.1522
SC	21.17572	2	10.58786	4.24	0.0204
SP	1.68166	2	0.84083	0.34	0.7159
SCP	42.94512	2	21.47256	8.60	0.0007
ERROR	114.87179	46	2.49721		

PA (Hospital)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1075.28197	1	1075.28197	15.56	0.0004
CLASS	109.66371	1	109.66371	1.59	0.2163
DEM	150.76707	1	150.76707	2.18	0.1489
CD	16.10547	1	16.10547	0.23	0.6324
ERROR	2349.56595	34	69.10488		
PA	241.05729	2	120.52864	2.32	0.1062
PC	444.07568	2	222.03784	4.27	0.0179
PD	42.81252	2	21.40626	0.41	0.6642
PCD	94.24013	2	47.12006	0.91	0.4067
ERROR	3536.04563	68	52.00067		

PA (Hospital, 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	996.62247	1	996.62247	13.65	0.0007
CLASS	144.71782	1	144.71782	1.98	0.1681
DEM	43.03486	1	43.03486	0.59	0.4479
CD	37.00387	1	37.00387	0.51	0.4813
ERROR	2556.36472	35	73.03899		
PA	175.97532	1	175.97532	3.56	0.0675
PC	416.63801	1	416.63801	8.43	0.0063
PD	3.15529	1	3.15529	0.06	0.8020
PCD	74.34957	1	74.34957	1.50	0.2281
ERROR	1729.49459	35	49.41413		

PA (Hospital, 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	315.29925	1	315.29925	5.34	0.0267
CLASS	12.03447	1	12.03447	0.20	0.6545
DEM	126.71532	1	126.71532	2.14	0.1520
CD	37.02974	1	37.02974	0.63	0.4337
ERROR	2067.64904	35	59.07569		
PA	0.09830	1	0.09830	0.00	0.9497
PC	30.08646	1	30.08646	1.23	0.2754
PD	38.27086	1	38.27086	1.56	0.2197
PCD	65.63022	1	65.63022	2.68	0.1107
ERROR	857.64904	35	24.50426		

IP (Hosp.)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	24348.27521	1	24348.27521	59.51	0.0000
CLASS	290.16276	1	290.16276	0.71	0.4056
DEM	229.53921	1	229.53921	0.56	0.4590
CD	2.66413	1	2.66413	0.01	0.9362
ERROR	13910.73261	34	409.13919		
IP	1876.74467	2	938.37234	4.94	0.0099
IC	1659.66679	2	829.83437	4.37	0.0164
ID	1186.04757	2	593.02378	3.12	0.0505
ICD	35.28155	2	17.64078	0.09	0.9113
ERROR	12920.71232	68	190.01048		

IP (Hospital, 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	19831.24116	1	19831.24116	61.73	0.0000
CLASS	167.50695	1	167.50695	0.52	0.4751
DEM	922.36939	1	922.36939	2.87	0.0991
CD	10.46643	1	10.46643	0.03	0.8578
ERROR	11244.67451	35	321.27641		
IP	1187.26308	1	1187.26308	6.99	0.0122
IC	1730.81943	1	1730.81943	10.18	0.0030
ID	3.37485	1	3.37485	0.02	0.8887
ICD	25.09237	1	25.09237	0.15	0.7031
ERROR	5947.64118	35	169.93832		

IP (Hospital,2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	11767.56648	1	11767.56648	33.05	0.0000
CLASS	0.09003	1	0.09003	0.00	0.9874
DEM	38.27086	1	38.27086	0.11	0.7450
CD	90.32052	1	90.32052	0.25	0.6176
ERROR	12460.10737	35	356.00307		
IP	30.90563	1	30.90563	0.16	0.6904
IC	561.66308	1	561.66308	2.93	0.0956
ID	890.39145	1	890.39145	4.65	0.0380
ICD	16.66804	1	16.66804	0.09	0.7696
ERROR	6704.94071	35	191.56973		

IP (Home, 1-2)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	5814.05000	1	5814.05000	9.30	0.0093
CLASS	8.45000	1	8.45000	0.01	0.9092
ERROR	8130.75000	13	625.44231		
IP	551.25000	1	551.25000	0.71	0.4141
IC	1051.25000	1	1051.25000	1.36	0.2650
ERROR	10069.41667	13	774.57051		

IP (Home, Occ. 2-3)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	2289.80000	1	2289.80000	10.98	0.0056
CLASS	245.00000	1	245.00000	1.17	0.2982
ERROR	2712.00000	13	208.61538		
IP	24.20000	1	24.20000	0.07	0.7934
IC	192.20000	1	192.20000	0.57	0.4647
ERROR	4402.66667	13	338.66667		

Appendix 12

ANOVA Tables for Experiment 2

KEY TO APPENDIX 12

All Koskela, G.R.S., Ferm's and Extended Orientation Test variables have the same code as in the Key to Appendix 10 + 11. The following changes apply to the variables of Ward Social Behaviour and Activity.

WSBA Scale	Prosocial	-	PS
	Nonsocial	-	NS
	Antisocial	-	AS
	Pass. act.	-	PA
	Act. act.	-	AA
	Total act.	-	TA

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	787.57425	1	787.57425	141.01	0.0000
CLASS	8.95924	1	8.95924	1.60	0.2199
DEM	423.98103	1	423.98103	75.91	0.0000
CD	2.51856	1	2.51856	0.45	0.5096
ERROR	111.70238	20	5.58512		
KO	26.03551	1	26.03551	4.02	0.0587
KC	0.16142	1	0.16142	0.02	0.8761
KD	15.18805	1	15.18805	2.35	0.1413
KCD	0.02583	1	0.02583	0.00	0.9503
ERROR	129.48810	20	6.47440		

ALYSIS OF VARIANCE FOR 1-ST
PENDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	760.91018	1	760.91018	72.63	0.0000
CLASS	0.11243	1	0.11243	0.01	0.9189
DEM	556.66299	1	556.66299	53.13	0.0000
CD	0.00007	1	0.00007	0.00	0.9988
ERROR	157.14881	15	10.47659		
KM	6.14025	1	6.14025	2.36	0.1454
KC	5.43238	1	5.43238	2.09	0.1692
KD	1.69081	1	1.69081	0.65	0.4327
KCD	0.57845	1	0.57645	0.22	0.6442
ERROR	39.05357	15	2.60357		

ALYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	1498.84671	1	1498.84671	67.73	0.0000
CLASS	8.95907	1	8.95907	0.40	0.5342
DEM	502.84671	1	502.84671	22.72	0.0002
CD	25.54334	1	25.54334	1.15	0.2996
ERROR	331.92857	15	22.12857		
KC	7.28331	1	7.28331	3.18	0.0948
KC	1.75522	1	1.75522	0.77	0.3952
KD	0.40690	1	0.40690	0.18	0.6794
KCD	0.54173	1	0.54173	0.24	0.6338
ERROR	34.35714	15	2.29048		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILIT
MEAN	761.81280	1	761.81280	38.41	0.0000
CLASS	39.75662	1	39.75662	2.00	0.1772
DEM	462.95887	1	462.95887	23.34	0.0002
CD	8.81280	1	8.81280	0.44	0.5151
ERROR	297.48214	15	19.83214		
KP	0.26545	1	0.26545	0.05	0.8193
KC	2.38904	1	2.38904	0.49	0.4961
KD	0.26545	1	0.26545	0.05	0.8193
KCD	2.38904	1	2.38904	0.49	0.4961
ERROR	[illegible]	15	[illegible]		

YSIS OF VARIANCE FOR 1-ST
NDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	19561.15597	1	19561.15597	75.70	0.0000
CLASS	277.78518	1	277.78518	1.08	0.3162
DEM	10393.33574	1	10393.33574	40.22	0.0000
CD	2.41439	1	2.41439	0.01	0.9243
ERROR	3876.02381	15	258.40159		
KT	134.09952	1	134.09952	3.06	0.1004
KC	0.61637	1	0.61637	0.01	0.9071
KD	31.29053	1	31.29053	0.72	0.4111
KCD	0.00963	1	0.00963	0.00	0.9884
ERROR	656.42857	15	43.76190		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	22772.61145	1	22772.61145	223.52	0.0000
CLASS	191.55992	1	191.55992	1.88	0.1833
DEM	661.55468	1	661.55468	6.49	0.0180
CD	2.04027	1	2.04027	0.02	0.8887
ERROR	2343.24444	23	101.88019		
GT	261.79585	1	261.79585	8.75	0.0070
GC	0.86659	1	0.86659	0.03	0.8663
GD	53.49891	1	53.49891	1.79	0.1942
GCD	23.34694	1	23.34694	0.78	0.3861
ERROR	687.95000	23	29.91087		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	849.22300	1	849.22300	125.01	0.0000
CLASS	0.52781	1	0.52781	0.08	0.7829
DEM	41.53742	1	41.53742	6.11	0.0212
CD	0.52781	1	0.52781	0.08	0.7829
ERROR	156.24861	23	6.79342		
ADL	13.08807	1	13.08807	4.59	0.0429
AC	0.31252	1	0.31252	0.11	0.7433
AD	8.45925	1	8.45925	2.97	0.0983
ACD	2.46100	1	2.46100	0.86	0.3624
ERROR	65.54861	23	2.84994		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6615.21516	1	6615.21516	158.13	0.0000
CLASS	129.56625	1	129.56625	3.10	0.0917
DEM	166.14966	1	166.14966	3.97	0.0583
CD	9.96800	1	9.96800	0.24	0.6301
ERROR	962.19444	23	41.83454		
WAP	70.52462	1	70.52462	11.56	0.0025
WC	1.60235	1	1.60235	0.26	0.6132
WD	9.47659	1	9.47659	1.55	0.2252
WCD	5.42768	1	5.42768	0.89	0.3554
ERROR	140.32776	23	6.10121		

SIS OF VARIANCE FOR 1-ST
DENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	100.36769	1	100.36769	21.14	0.0001
CLASS	1.76856	1	1.76856	0.37	0.5476
DEM	2.27162	1	2.27162	0.48	0.4960
CD	1.76856	1	1.76856	0.37	0.5476
ERROR	109.20000	23	4.74783		
ASD	4.78253	1	4.78253	2.38	0.1365
AC	0.08734	1	0.08734	0.04	0.8367
AD	0.59039	1	0.59039	0.29	0.5929
ACD	0.08734	1	0.08734	0.04	0.8367
ERROR	46.20000	23	2.00870		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	111.51713	1	111.51713	60.43	0.0000
CLASS	0.18787	1	0.18787	0.10	0.7526
DEM	4.19835	1	4.19835	2.28	0.1451
CD	1.30577	1	1.30577	0.71	0.4089
ERROR	42.44444	23	1.84541		
F1	3.95963	1	3.95963	4.77	0.0395
FC	0.01902	1	0.01902	0.02	0.8811
FD	0.32644	1	0.32644	0.39	0.5370
FCD	0.71771	1	0.71771	0.86	0.3623
ERROR	19.11111	23	0.83092		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	416.51121	1	416.51121	82.41	0.0000
CLASS	0.68065	1	0.68065	0.13	0.7170
DEM	34.44135	1	34.44135	6.81	0.0156
CD	0.89899	1	0.89899	0.18	0.6771
ERROR	116.24861	23	5.05429		
F2	3.98909	1	3.98909	3.99	0.0578
FC	0.64062	1	0.64062	0.64	0.4318
FD	0.87119	1	0.87119	0.87	0.3605
FCD	0.94629	1	0.94629	0.95	0.3409
ERROR	23.01528	23	1.00066		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	430.87121	1	430.87121	121.74	0.0000
CLASS	3.92016	1	3.92016	1.11	0.3065
DEM	36.81527	1	36.81527	10.40	0.0047
CD	0.10198	1	0.10198	0.03	0.8671
ERROR	63.70833	18	3.53935		
F3	1.38536	1	1.38536	0.92	0.3500
FC	0.16858	1	0.16858	0.11	0.7417
FD	0.00075	1	0.00075	0.00	0.9824
FCD	0.54620	1	0.54620	0.36	0.5544
ERROR	27.08929	18	1.50496		

LYSIS OF VARIANCE FOR 1-ST
ENDENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	154.97953	1	154.97953	72.54	0.0000
CLASS	0.19001	1	0.19001	0.09	0.7682
DEM	12.83979	1	12.83979	6.01	0.0222
CD	0.00660	1	0.00660	0.00	0.9561
ERROR	49.13750	23	2.13641		
F4	2.26420	1	2.26420	2.71	0.1133
FC	0.57162	1	0.57162	0.68	0.4166
FD	0.19433	1	0.19433	0.23	0.6342
FCD	0.16114	1	0.16114	0.19	0.6646
ERROR	19.21528	23	0.83545		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	259.17254	1	259.17254	64.84	0.0000
CLASS	13.26687	1	13.26687	3.32	0.0815
DEM	26.06337	1	26.06337	6.52	0.0178
CD	1.34547	1	1.34547	0.34	0.5674
ERROR	91.93750	23	3.99728		
F5	0.55682	1	0.55682	0.74	0.3990
FC	0.00660	1	0.00660	0.01	0.9262
FD	1.21184	1	1.21184	1.61	0.2175
FCD	0.19001	1	0.19001	0.25	0.6204
ERROR	17.33750	23	0.75380		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	261.63649	1	261.63649	62.61	0.0000
CLASS	7.28540	1	7.28540	1.74	0.1997
DEM	34.70199	1	34.70199	8.30	0.0084
CD	2.67404	1	2.67404	0.64	0.4319
ERROR	96.11111	23	4.17874		
F6	0.59799	1	0.59799	0.83	0.3711
FC	0.46873	1	0.46873	0.65	0.4276
FD	3.37528	1	3.37528	4.70	0.0408
FCD	1.08008	1	1.08008	1.50	0.2326
ERROR	16.52778	23	0.71860		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	398.51550	1	398.51550	91.16	0.0000
CLASS	0.13646	1	0.13646	0.03	0.8613
DEM	68.22729	1	68.22729	15.61	0.0006
CD	4.59061	1	4.59061	1.05	0.3161
ERROR	100.55000	23	4.37174		
F7	1.50415	1	1.50415	0.84	0.3676
FC	2.88755	1	2.88755	1.62	0.2156
FD	3.86223	1	3.86223	2.17	0.1543
FCD	0.00546	1	0.00546	0.00	0.9563
ERROR	40.95000	23	1.78043		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	473.73996	1	473.73996	143.09	0.0000
CLASS	0.86659	1	0.86659	0.26	0.6138
DEM	62.96266	1	62.96266	19.02	0.0002
CD	1.65262	1	1.65262	0.50	0.4870
ERROR	76.15000	23	3.31087		
F8	8.58867	1	8.58867	6.84	0.0154
FC	0.02972	1	0.02972	0.02	0.8790
FD	1.33976	1	1.33976	1.07	0.3122
FCD	3.78518	1	3.78518	3.02	0.0958
ERROR	28.86111	23	1.25483		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	516.98834	1	516.98834	117.30	0.0000
CLASS	7.89744	1	7.89744	1.79	0.1974
DEM	23.56177	1	23.56177	5.35	0.0328
CD	0.06527	1	0.06527	0.01	0.9045
ERROR	79.33333	18	4.40741		
F9	0.60148	1	0.60148	0.34	0.5646
FC	0.78330	1	0.78330	0.45	0.5116
FD	4.13994	1	4.13994	2.37	0.1411
FCD	0.15393	1	0.15393	0.09	0.7700
ERROR	31.44048	18	1.74669		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	647.69260	1	647.69260	135.60	0.0000
CLASS	2.02623	1	2.02623	0.42	0.5213
DEM	27.41312	1	27.41312	5.74	0.0251
CD	3.12666	1	3.12666	0.65	0.4268
ERROR	109.86111	23	4.77657		
F10	0.20090	1	0.20090	0.17	0.6833
FC	2.56247	1	2.56247	2.18	0.1536
FD	0.00876	1	0.00876	0.01	0.9320
FCD	0.02972	1	0.02972	0.03	0.8751
ERROR	27.06111	23	1.17657		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1074.45475	1	1074.45475	372.58	0.0000
CLASS	11.78576	1	11.78576	4.09	0.0550
DEM	19.43292	1	19.43292	6.74	0.0162
CD	0.67659	1	0.67659	0.23	0.6327
ERROR	66.32778	23	2.88382		
F11	2.16887	1	2.16887	2.06	0.1645
FC	7.25883	1	7.25883	6.90	0.0151
FD	0.00294	1	0.00294	0.00	0.9583
FCD	2.43787	1	2.43787	2.32	0.1416
ERROR	24.19444	23	1.05193		

SIS OF VARIANCE FOR 1-ST
DENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	50620.35519	1	50620.35519	170.09	0.0000
CLASS	126.22419	1	126.22419	0.42	0.5213
DEM	3653.01895	1	3653.01895	12.27	0.0019
CD	30.92288	1	30.92288	0.10	0.7501
ERROR	6844.92778	23	297.60556		
FT	63.19738	1	63.19738	1.83	0.1893
FC	49.88734	1	49.88734	1.44	0.2417
FD	101.55546	1	101.55546	2.94	0.0998
FCD	24.94410	1	24.94410	0.72	0.4042
ERROR	794.40000	23	34.53913		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	25621.75ØØØ	1	25621.75ØØØ	143.6Ø	Ø.ØØØØ
CLASS	35Ø.Ø3571	1	35Ø.Ø3571	1.96	Ø.1793
DEM	2622.89286	1	2622.89286	14.7Ø	Ø.ØØ13
CD	15.75ØØØ	1	15.75ØØØ	Ø.Ø9	Ø.77ØØ
ERROR	3Ø33.125ØØ	17	178.41912		
OT	7.3373Ø	1	7.3373Ø	Ø.27	Ø.6115
OC	Ø.ØØ397	1	Ø.ØØ397	Ø.ØØ	Ø.9905
OD	2.48Ø16	1	2.48Ø16	Ø.Ø9	Ø.7672
OCD	3.3373Ø	1	3.3373Ø	Ø.12	Ø.7314
ERROR	465.79167	17	27.39951		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3391.66766	1	3391.66766	76.11	Ø.ØØØØ
CLASS	159.5248Ø	1	159.5248Ø	3.58	Ø.Ø756
DEM	559.5248Ø	1	559.5248Ø	12.56	Ø.ØØ25
CD	5.28671	1	5.28671	Ø.12	Ø.7347
ERROR	757.52Ø83	17	44.56ØØ5		
VT	12.66766	1	12.66766	1.43	Ø.2486
VC	5.ØØØ99	1	5.ØØØ99	Ø.56	Ø.4631
VD	Ø.95337	1	Ø.95337	Ø.11	Ø.7471
VCD	5.28671	1	5.28671	Ø.6Ø	Ø.4588
ERROR	15Ø.85417	17	8.87377		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	115Ø.72321	1	115Ø.72321	88.64	Ø.ØØØØ
CLASS	8.58Ø36	1	8.58Ø36	Ø.66	Ø.4275
DEM	114.ØØ893	1	114.ØØ893	8.78	Ø.ØØ87
CD	Ø.4375Ø	1	Ø.4375Ø	Ø.Ø3	Ø.8565
ERROR	22Ø.6675Ø	17	12.98162		
VP	Ø.Ø8Ø36	1	Ø.Ø8Ø36	Ø.Ø5	Ø.8341
VC	Ø.22321	1	Ø.22321	Ø.13	Ø.7273
VD	Ø.5248Ø	1	Ø.5248Ø	Ø.3Ø	Ø.5938
VCD	Ø.28671	1	Ø.28671	Ø.16	Ø.6926
ERROR	3Ø.1875Ø	17	1.77574		

SIS OF VARIANCE FOR 1-51
DENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4539.00893	1	4539.00893	242.22	0.0000
CLASS	9.72321	1	9.72321	0.52	0.4811
DEM	286.08036	1	286.08036	15.27	0.0011
CD	0.22321	1	0.22321	0.01	0.9144
ERROR	318.56250	17	18.73897		
VR	0.35813	1	0.35813	0.06	0.8141
VC	1.35813	1	1.35813	0.22	0.6478
VD	1.66766	1	1.66766	0.27	0.6129
VCD	0.00099	1	0.00099	0.00	0.9901
ERROR	106.72917	17	6.27819		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	52441.16907	1	52441.16907	53.78	0.0000
CLASS	2238.81836	1	2238.81836	2.30	0.1452
DEM	1452.87839	1	1452.87839	1.49	0.2371
CD	136.21489	1	136.21489	0.14	0.7127
ERROR	18525.32540	19	975.01713		
PS	3651.60645	1	3651.60645	9.33	0.0065
PC	438.14673	1	438.14673	1.12	0.3032
PD	84.06774	1	84.06774	0.21	0.6482
PCD	12.52272	1	12.52272	0.03	0.8599
ERROR	7433.70635	19	391.24770		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	146111.87377	1	146111.87377	143.30	0.0000
CLASS	1728.02543	1	1728.02543	1.69	0.2085
DEM	1740.28451	1	1740.28451	1.71	0.2070
CD	70.59731	1	70.59731	0.07	0.7953
ERROR	19372.63492	19	1019.61236		
NS	4271.85921	1	4271.85921	11.53	0.0030
NC	242.09618	1	242.09618	0.65	0.4289
ND	28.53536	1	28.53536	0.08	0.7844
NCD	0.02351	1	0.02351	0.00	0.9937
ERROR	7038.70635	19	370.45823		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	17.61048	1	17.61048	2.26	0.1468
CLASS	17.61048	1	17.61048	2.26	0.1468
DEM	3.35721	1	3.35721	0.43	0.5185
CD	3.35721	1	3.35721	0.43	0.5185
ERROR	179.60000	23	7.80870		
AS	17.61048	1	17.61048	2.26	0.1468
AC	17.61048	1	17.61048	2.26	0.1468
AD	3.35721	1	3.35721	0.43	0.5185
ACD	3.35721	1	3.35721	0.43	0.5185
ERROR	179.60000	23	7.80870		

SIS OF VARIANCE FOR 1-ST
DENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	810.50794	1	810.50794	7.93	0.0110
CLASS	232.46054	1	232.46054	2.27	0.1481
DEM	57.64854	1	57.64854	0.56	0.4619
CD	3.43053	1	3.43053	0.03	0.8566
ERROR	1942.82540	19	102.25397		
PA	15.11909	1	15.11909	0.24	0.6328
PC	177.77311	1	177.77311	2.77	0.1123
PD	147.16332	1	147.16332	2.29	0.1463
PCD	1.19176	1	1.19176	0.02	0.8930
ERROR	1218.53968	19	64.13367		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	842.59719	1	842.59719	9.36	0.0065
CLASS	193.64933	1	193.64933	2.15	0.1589
DEM	205.78203	1	205.78203	2.29	0.1471
CD	0.58772	1	0.58772	0.01	0.9365
ERROR	1710.99206	19	90.05221		
AA	7.61679	1	7.61679	0.06	0.8102
AC	7.61679	1	7.61679	0.06	0.8102
AD	3.52200	1	3.52200	0.03	0.8702
ACD	3.52200	1	3.52200	0.03	0.8702
ERROR	2438.85714	19	128.36090		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3305.89878	1	3305.89878	14.04	0.0014
CLASS	850.44854	1	850.44854	3.61	0.0727
DEM	45.59546	1	45.59546	0.19	0.6649
CD	1.17840	1	1.17840	0.01	0.9443
ERROR	4474.69046	19	235.51003		
TA	1.27345	1	1.27345	0.01	0.9373
TC	111.79478	1	111.79478	0.56	0.4646
TD	196.21816	1	196.21816	0.98	0.3352
TCD	0.61626	1	0.61626	0.00	0.9564
ERROR	3812.96825	19	200.68254		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	14685.10047	1	14685.10047	33.53	0.0000
CLASS	819.26160	1	819.26160	1.87	0.1874
DEM	357.97882	1	357.97882	0.82	0.3773
CD	0.23475	1	0.23475	0.00	0.9818
ERROR	8322.46825	19	438.02464		
IP	85.19616	1	85.19616	0.28	0.6003
IC	173.70800	1	173.70800	0.58	0.4568
ID	729.19616	1	729.19616	2.43	0.1355
ICD	85.19616	1	85.19616	0.28	0.6003
ERROR	5699.61111	19	299.97953		

IS OF VARIANCE FOR I-51
ENT VARIABLE - AD1 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	81.28894	1	81.28894	3.14	0.0894
CLASS	0.18152	1	0.18152	0.01	0.9339
DEM	0.73873	1	0.73873	0.03	0.8672
CD	0.60947	1	0.60947	0.02	0.8793
ERROR	594.54861	23	25.84994		
IG	46.90660	1	46.90660	2.84	0.1053
IC	6.72495	1	6.72495	0.41	0.5295
ID	1.71010	1	1.71010	0.10	0.7504
ICD	8.69001	1	8.69001	0.53	0.4753
ERROR	379.43750	23	16.49728		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	262.45100	1	262.45100	13.47	0.0016
CLASS	14.71640	1	14.71640	0.76	0.3956
DEM	183.62635	1	183.62635	9.43	0.0063
CD	1.40834	1	1.40834	0.07	0.7909
ERROR	370.08929	19	19.47838		
IS	10.54579	1	10.54579	0.57	0.4595
IC	4.91545	1	4.91545	0.27	0.6121
ID	34.77327	1	34.77327	1.88	0.1863
ICD	23.68323	1	23.68323	1.28	0.2719
ERROR	351.42262	19	18.49593		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4085.14490	1	4085.14490	17.70	0.0005
CLASS	133.15438	1	133.15438	0.58	0.4569
DEM	1643.17649	1	1643.17649	7.12	0.0152
CD	132.58882	1	132.58882	0.57	0.4578
ERROR	4385.67659	19	230.82508		
IO	517.30130	1	517.30130	6.98	0.0161
IC	0.87476	1	0.87476	0.01	0.9146
ID	52.77365	1	52.77365	0.71	0.4093
ICD	48.84000	1	48.84000	0.66	0.4271
ERROR	1408.67659	19	74.14087		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	169458.68656	1	169458.68656	174.66	0.0000
CLASS	1424.96145	1	1424.96145	1.47	0.2404
DEM	879.30584	1	879.30584	0.91	0.3531
CD	33.44802	1	33.44802	0.03	0.8547
ERROR	18434.13492	19	970.21763		
IN	1336.55010	1	1336.55010	3.50	0.0767
IC	152.41740	1	152.41740	0.40	0.5348
ID	297.21361	1	297.21361	0.78	0.3884
ICD	5.28944	1	5.28944	0.01	0.9075
ERROR	7246.92857	19	381.41729		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	19828.54134	1	19828.54134	25.83	0.0001
CLASS	82.83518	1	82.83518	0.11	0.7461
DEM	4102.80358	1	4102.80358	5.35	0.0322
CD	645.93154	1	645.93154	0.84	0.3705
ERROR	14583.44444	19	767.54971		
AF	838.32999	1	838.32999	2.42	0.1363
AC	27.23994	1	27.23994	0.08	0.7822
AD	5.86869	1	5.86869	0.02	0.8978
ACD	110.11514	1	110.11514	0.32	0.5795
ERROR	6582.37302	19	346.44069		

Appendix 13

REALITY ORIENTATION PROJECT

RESIDENT PERSONAL INFORMATION SHEET

i BACKGROUND

Name:

Age:

Date of Birth:

Place of Birth:

Main living addresses during life (specify years if known):

1.

2.

3.

ii FAMILY AND FRIENDS

Marital Status: Married, Single, Widowed, Separated (circle as necessary)

Name of Spouse

Children (Total Number):

Name and Age	Address/Town	Occupation/Situation	Alive (A) / Dead (D)
1.			
2.			
3.			
4.			

Grandchildren (Total Number):

Name	Age	Parent
1.		
2.		
3.		
4.		
5.		
6.		

Brothers/Sisters (Total Number):

Name and Age	Address/Town	Occupation/Situation	Alive (A) Dead (D)
1.			
2.			
3.			
4.			
5.			

Next of Kin: Address:

Visitors (specify relationship): Frequency of visits:

1.

2.

3.

iii PREVIOUS PERSONALITY AND WAY OF LIFE

Level of schooling:

Literacy level:

Occupation(s):

1.

2.

Hobbies:

Personality/lifestyle:

Situation/circumstances before admission:

Date of admission:

Appendix 13 cont.

STAFF PROCEDURES INVENTORY

Before we get fully underway with R.O., I would like to know more about some of the procedures and methods presently adopted by you, other staff members and the setting in general.

After each statement, put an "X" in the space that best describes your response or opinion to that statement.

	Always	Most of the time	Half the time	Once in a while	Never
1. When speaking to residents, I address them by name					
2. When speaking to residents, I tell them my name and my position.					
3. When speaking to residents, I try and remind them where they are.					
4. When speaking to residents, I try and remind them what time it is.					
5. I make sure each resident knows that I expect him to care for himself in certain ways.					
6. When speaking to residents, other staff members address the patients by name.					
7. When speaking to residents, other staff members introduce themselves by name and position.					
8. When speaking to residents other staff members try to remind them what time it is.					
9. When speaking to residents, other staff members try to remind them where they are.					

	Always	Most of the time	Half of the time	Once in a while	Never
0. Other staff members make sure each resident knows that he's expected to care for himself.					
1. When I go off shift, I tell those coming on how the residents did during my shift.					
2. When I come on shift, other staff members tell me how the residents did during their shift.					
3. If a resident is talking nonsense, I don't allow him to continue.					
4. If a resident is talking nonsense, other staff members don't allow him to continue.					
5. I know each resident's personal history.					
6. Other staff members know each resident's personal history.					
7. When I move a resident from place to place, I tell him where he's going.					
8. When other staff members move a resident from place to place, they tell him where he's going.					
9. Before I do something for the resident, like bathe him or administer medicine, I tell him what I'm going to do and why I'm going to do it.					
0. Before other staff members do something for the resident, they tell him what and why.					
1. I am included in resident evaluation meetings.					

Training Session // 1

	Always	Most of the time	Half the time	Once in a while	Never
2. I use props like calendars and clocks to remind residents of time					
3. Other staff members use props like calendars and clocks to remind resident's of time.					
4. I answer residents' questions with the truth.					
5. Other staff members answer residents' questions with the truth.					
6. If I'm frustrated by a resident's behaviour, I don't show my frustration to the resident.					
7. If a resident makes progress, I note it in the written records or notify another staff member who does.					
8. Other staff members who note resident progress make sure it's noted in written records.					
9. When a resident answers my questions incorrectly, I tell the resident the correct answer.					
0. Other staff members give residents correct answers to correct the residents' incorrect answers.					
1. Someone in charge gives me details about new residents.					
2. Our facility provides the necessary props for R.O. use.					
3. The atmosphere in our ward is calm.					

Appendix 13 cont.

R.O. MATERIALS INVENTORY

For each item, put an "X" in two spaces. Your first "X" is to indicate whether or not your care setting has the item. Your second "X" is to indicate whether or not you think the care setting should have it. The space on the right is for ideas on how to obtain if you do not have an item and wish to obtain it.

		We have	We don't have	We should have	We shouldn't have	Ideas for obtaining
1. R.O. Board						
2. Large clocks in main rooms						
3. Large calendars in main rooms						
4. Large number on each room's door						
5. Name plate on each resident's bed						
6. Day-by-day calendar for each resident						
7. Alarm clock for each resident						
8. Labels for resident's clothing						
9. Labels for resident's personal articles						
10. Color-coded hallways						
11. Color-coded doors						
12. Large lettered or pictorial signs on doors						
13. Name tags with large letters for all staff members						
14. Name tags with large letters for all residents.						

	We have	Good condition	Poor condition	We don't have	Facility should provide	I have an idea how to obtain
5. Residents' rooms painted a variety of colors						
6. Main rooms painted different colors						
7. Pictures on walls of resident's rooms						
8. Pictures on walls of main rooms e.g. local landmarks.						
9. Regular program of rotating pictures from one room to another.						
0. Several sets of draughts games						
1. Several other kinds of games which require minimal skill and mental perception e.g. Junior scrabble.						
2. Notice Board						
3. Newspapers & magazines						
4. Diaries or reminder cards for each resident.						
5. Street map of area						
6. Posters made with photos cut from magazines						
7. Piano in sitting-room.						
8. Record player in sitting room						
9. Radio or T.V. in sitting room						
0. Radio available for residents' rooms						

Appendix 14

ANOVA Tables for Experiment 4

KEY TO APPENDICES 14 & 15

G.R.S. Total	-	GT
Act. daily. liv.	-	AL
Withdraw/apath.	-	WA
Antisoc./disrupt.	-	AD
Fern's Fields 1	-	1A or A1
2	-	R2
3	-	Q3 or R3
4	-	S4 or R4
5	-	T5 or R5
6	-	U6 or R6
7	-	7A or R7
8	-	X8 or R8
9	-	Y9 or R9
10	-	Z10 or R10
11	-	J11 or R11
Total	-	BT or RT

Extended Orientation - as in Keys to Appendices 10, 11, 12.

WSBA Prosocial	-	XS
Nonsocial	-	YS
Antisoc.	-	QA
Pass. act.	-	VA or PA
Act. act.	-	YA
Total act.	-	TA

The other variables are the same as previous keys.

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	26868.50025	1	26868.50025	252.79	0.0000
FOUR	427.47769	1	427.47769	4.02	0.0563
CLASS	30.70175	1	30.70175	0.29	0.5959
PLACE	9.04762	1	9.04762	0.09	0.7730
FC	60.17544	1	60.17544	0.57	0.4591
FP	24.08521	1	24.08521	0.23	0.6364
CP	1.22807	1	1.22807	0.01	0.7153
FCP	9.04762	1	9.04762	0.09	0.7730
ERROR	2550.93333	24	106.28889		
GT	0.42130	1	0.42130	0.02	0.8803
GF	1.98521	1	1.98521	0.11	0.7439
GC	1.81078	1	1.81078	0.10	0.7550
GP	40.70401	1	40.70401	2.24	0.1476
GFC	1.81078	1	1.81078	0.10	0.7550
GFP	23.62130	1	23.62130	1.30	0.2655
GCP	9.33359	1	9.33359	0.51	0.4805
GFCP	5.12506	1	5.12506	0.28	0.6003
ERROR	436.23333	24	18.17639		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1087.44085	1	1087.44085	119.92	0.0000
FOUR	15.29048	1	15.29048	1.69	0.2064
CLASS	4.43333	1	4.43333	0.49	0.4911
PLACE	0.34311	1	0.34311	0.04	0.8474
FC	2.35815	1	2.35815	0.26	0.6147
FP	0.55363	1	0.55363	0.06	0.8069
CP	0.21078	1	0.21078	0.02	0.8801
FCP	9.92506	1	9.92506	1.09	0.3059
ERROR	217.63333	24	9.06806		
AL	0.62657	1	0.62657	0.36	0.5527
AF	0.02506	1	0.02506	0.01	0.9051
AC	4.23559	1	4.23559	2.45	0.1305
AP	2.60752	1	2.60752	1.51	0.2312
AFC	1.22807	1	1.22807	0.71	0.4075
AFP	0.08120	1	0.08120	0.05	0.8302
ACP	2.60752	1	2.60752	1.51	0.2312
[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-S1
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	7486.63916	1	7486.63916	154.79	0.0000
FOUR	140.78954	1	140.78954	2.91	0.1009
CLASS	11.42412	1	11.42412	0.24	0.6314
PLACE	8.07525	1	8.07525	0.17	0.6864
FC	67.37901	1	67.37901	1.39	0.2494
FP	5.23315	1	5.23315	0.11	0.7451
CP	16.36096	1	16.36096	0.34	0.5662
FCP	12.07525	1	12.07525	0.25	0.6219
ERROR	1160.75833	24	48.36493		
WA	0.08578	1	0.08578	0.02	0.9034
WF	3.22863	1	3.22863	0.57	0.4593
WC	7.89630	1	7.89630	1.38	0.2510
WP	6.78202	1	6.78202	1.19	0.2865
WFC	3.46021	1	3.46021	0.61	0.4438
WFP	10.07525	1	10.07525	1.77	0.1964
WCP	0.56548	1	0.56548	0.10	0.7556
WFCP	4.40006	1	4.40006	0.77	0.3886
ERROR	136.95833	24	5.70660		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	50.30175	1	50.30175	13.16	0.0013
FOUR	7.41454	1	7.41454	1.94	0.1765
CLASS	10.02506	1	10.02506	2.62	0.1184
PLACE	0.01604	1	0.01604	0.00	0.9489
FC	4.91228	1	4.91228	1.29	0.2681
FP	0.19649	1	0.19649	0.05	0.8226
CP	0.78596	1	0.78596	0.21	0.6543
FCP	6.74085	1	6.74085	1.76	0.1967
ERROR	91.73333	24	3.82222		
AD	0.65188	1	0.65188	2.01	0.1687
AF	0.38120	1	0.38120	1.18	0.2886
AC	0.50752	1	0.50752	1.57	0.2225
AP	0.21078	1	0.21078	0.65	0.4276
AFC	0.05639	1	0.05639	0.17	0.6801
AFP	0.42130	1	0.42130	1.30	0.2651
ACP	0.34311	1	0.34311	1.06	0.3134

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	164.66673	1	164.66673	50.71	0.0000
FOUR	1.93503	1	1.93503	0.60	0.4474
CLASS	0.00549	1	0.00549	0.00	0.9675
PLACE	0.34153	1	0.34153	0.11	0.7484
FC	2.73720	1	2.73720	0.84	0.3673
FP	0.95942	1	0.95942	0.30	0.5915
CP	3.19031	1	3.19031	0.98	0.3311
FCP	0.36104	1	0.36104	0.11	0.7416
ERROR	81.17500	25	3.24700		
1A	0.00007	1	0.00007	0.00	0.9911
1F	2.47161	1	2.47161	4.60	0.0419
1C	0.01524	1	0.01524	0.03	0.8676
1P	0.06511	1	0.06511	0.12	0.7308
1FC	0.01524	1	0.01524	0.03	0.8676
1FP	0.42283	1	0.42283	0.79	0.3836
1CP	2.12256	1	2.12256	3.95	0.0580
1FCP	0.07378	1	0.07378	0.14	0.7142
ERROR	13.44167	25	0.53767		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	470.40820	1	470.40820	97.48	0.0000
FOUR	3.74153	1	3.74153	0.78	0.3870
CLASS	2.21958	1	2.21958	0.46	0.5039
PLACE	17.41524	1	17.41524	3.61	0.0691
FC	3.55291	1	3.55291	0.74	0.3990
FP	8.92744	1	8.92744	1.85	0.1859
CP	0.04939	1	0.04939	0.01	0.9202
FCP	1.02500	1	1.02500	0.21	0.6489
ERROR	120.64167	25	4.82567		
R2	0.38110	1	0.38110	0.59	0.4509
RF	0.38110	1	0.38110	0.59	0.4509
RC	0.09275	1	0.09275	0.14	0.7087
RP	2.36917	1	2.36917	3.65	0.0677
RFC	0.77568	1	0.77568	1.19	0.2849
RFP	0.12527	1	0.12527	0.19	0.6643
RCP	0.38110	1	0.38110	0.59	0.4509

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	656.13442	1	656.13442	117.17	0.0000
FOUR	13.59783	1	13.59783	2.43	0.1317
CLASS	5.01247	1	5.01247	0.90	0.3532
PLACE	12.17995	1	12.17995	2.17	0.1528
FC	4.16694	1	4.16694	0.74	0.3966
FP	0.01734	1	0.01734	0.00	0.9561
CP	7.64878	1	7.64878	1.37	0.2535
FCP	17.20976	1	17.20976	3.07	0.0919
ERROR	140.00000	25	5.60000		
Q3	6.26125	1	6.26125	8.21	0.0083
QF	1.25312	1	1.25312	1.64	0.2117
QC	0.00434	1	0.00434	0.01	0.9405
QP	0.00000	1	0.00000	0.00	1.0000
QFC	0.06938	1	0.06938	0.09	0.7654
QFP	0.97561	1	0.97561	1.28	0.2688
QCP	0.03902	1	0.03902	0.05	0.8229
QFCP	0.62439	1	0.62439	0.82	0.3742
ERROR	19.06667	25	0.76267		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	151.42446	1	151.42446	89.62	0.0000
FOUR	5.89600	1	5.89600	3.49	0.0735
CLASS	1.58598	1	1.58598	0.94	0.3419
PLACE	1.38543	1	1.38543	0.82	0.3738
FC	0.22012	1	0.22012	0.13	0.7212
FP	0.14966	1	0.14966	0.09	0.7685
CP	0.01524	1	0.01524	0.01	0.9251
FCP	4.40549	1	4.40549	2.61	0.1189
ERROR	42.24167	25	1.68967		
S4	2.07486	1	2.07486	4.64	0.0410
SF	2.07486	1	2.07486	4.64	0.0410
SC	1.12744	1	1.12744	2.52	0.1248
SP	0.11389	1	0.11389	0.25	0.6181
SFC	0.44451	1	0.44451	0.99	0.3282
SFP	0.53665	1	0.53665	1.20	0.2837
SCP	0.20495	1	0.20495	0.46	0.5045
SFCP	0.20495	1	0.20495	0.46	0.5045

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	332.40007	1	332.40007	71.24	0.0000
FOUR	0.20495	1	0.20495	0.04	0.8357
CLASS	0.34153	1	0.34153	0.07	0.7890
PLACE	2.90305	1	2.90305	0.62	0.4376
FC	0.99194	1	0.99194	0.21	0.6487
FP	0.26890	1	0.26890	0.06	0.8122
CP	2.12256	1	2.12256	0.45	0.5062
FCP	2.90305	1	2.90305	0.62	0.4376
ERROR	116.64167	25	4.66567		
T5	0.74695	1	0.74695	0.41	0.5261
TF	0.74695	1	0.74695	0.41	0.5261
TC	0.00549	1	0.00549	0.00	0.9565
TP	0.01524	1	0.01524	0.01	0.9276
TFC	0.10305	1	0.10305	0.06	0.8132
TFP	0.01524	1	0.01524	0.01	0.9276
TCP	0.44451	1	0.44451	0.25	0.6242
TFCP	1.12744	1	1.12744	0.62	0.4370
ERROR	45.17500	25	1.80700		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	261.86694	1	261.86694	74.09	0.0000
FOUR	3.10271	1	3.10271	0.88	0.3578
CLASS	0.45556	1	0.45556	0.13	0.7226
PLACE	3.33902	1	3.33902	0.94	0.3404
FC	0.22791	1	0.22791	0.06	0.8016
FP	0.11951	1	0.11951	0.03	0.8556
CP	1.77805	1	1.77805	0.50	0.4847
FCP	0.70488	1	0.70488	0.20	0.6590
ERROR	88.36667	25	3.53467		
U6	0.33198	1	0.33198	0.26	0.6119
UF	2.44580	1	2.44580	1.95	0.1754
UC	0.22791	1	0.22791	0.18	0.6739
UP	0.22791	1	0.22791	0.18	0.6739
UFC	0.45556	1	0.45556	0.36	0.5526
UFP	0.45556	1	0.45556	0.36	0.5526
UCP	1.86694	1	1.86694	1.48	0.2344

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	273.17507	1	273.17507	59.56	0.0000
FOUR	8.39458	1	8.39458	1.83	0.1882
CLASS	0.06938	1	0.06938	0.02	0.9031
PLACE	17.20976	1	17.20976	3.75	0.0641
FC	3.64661	1	3.64661	0.80	0.3811
FP	0.62439	1	0.62439	0.14	0.7153
CP	1.40488	1	1.40488	0.31	0.5849
FCP	0.03902	1	0.03902	0.01	0.9272
ERROR	114.66667	25	4.58667		
7A	0.08780	1	0.08780	0.19	0.6673
7F	0.08780	1	0.08780	0.19	0.6673
7C	1.48401	1	1.48401	3.20	0.0858
7P	2.00434	1	2.00434	4.32	0.0481
7FC	2.00434	1	2.00434	4.32	0.0481
7FP	1.48401	1	1.48401	3.20	0.0858
7CP	1.32791	1	1.32791	2.86	0.1031
7FCP	0.02710	1	0.02710	0.06	0.8110
ERROR	11.60000	25	0.46400		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	617.50413	1	617.50413	119.76	0.0000
FOUR	7.42283	1	7.42283	1.44	0.2415
CLASS	0.40169	1	0.40169	0.08	0.7825
PLACE	8.15779	1	8.15779	1.58	0.2201
FC	2.02771	1	2.02771	0.39	0.5363
FP	2.79194	1	2.79194	0.54	0.4687
CP	7.06836	1	7.06836	1.37	0.2527
FCP	0.01145	1	0.01145	0.00	0.9628
ERROR	128.90833	25	5.15633		
X8	2.90305	1	2.90305	3.23	0.0842
XF	2.12256	1	2.12256	2.36	0.1367
XC	0.34153	1	0.34153	0.38	0.5429
XP	3.42988	1	3.42988	3.82	0.0619
XFC	0.99194	1	0.99194	1.11	0.3032
XFP	0.01524	1	0.01524	0.02	0.8974
XCP	0.11389	1	0.11389	0.13	0.7247
XFCP	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR .1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	456.93828	1	456.93828	67.85	0.0000
FOUR	2.02771	1	2.02771	0.30	0.5881
CLASS	2.36917	1	2.36917	0.35	0.5584
PLACE	4.90251	1	4.90251	0.73	0.4017
FC	11.00332	1	11.00332	1.63	0.2129
FP	22.86999	1	22.86999	3.40	0.0773
CP	1.34695	1	1.34695	0.20	0.6586
FCP	0.32256	1	0.32256	0.05	0.8285
ERROR	168.37500	25	6.73500		
Y9	0.36104	1	0.36104	0.79	0.3815
YF	1.38543	1	1.38543	3.04	0.0933
YC	0.34153	1	0.34153	0.75	0.3945
YP	0.26890	1	0.26890	0.59	0.4492
YFC	0.00007	1	0.00007	0.00	0.9904
YFP	1.58598	1	1.58598	3.49	0.0737
YCP	0.16267	1	0.16267	0.36	0.5553
YFCP	0.95942	1	0.95942	2.11	0.1589
ERROR	11.37500	25	0.45500		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	694.63442	1	694.63442	124.78	0.0000
FOUR	0.22791	1	0.22791	0.04	0.8413
CLASS	15.22195	1	15.22195	2.73	0.1107
PLACE	0.33198	1	0.33198	0.06	0.8091
FC	2.05122	1	2.05122	0.37	0.5493
FP	0.16938	1	0.16938	0.03	0.8629
CP	0.06098	1	0.06098	0.01	0.9175
FCP	0.54878	1	0.54878	0.10	0.7561
ERROR	139.16667	25	5.55667		
Z10	1.11003	1	1.11003	1.21	0.2811
ZF	0.52466	1	0.52466	0.57	0.4559
ZC	0.03902	1	0.03902	0.04	0.8380
ZP	1.56531	1	1.56531	1.71	0.2027
ZFC	0.62439	1	0.62439	0.68	0.4165
ZFP	0.84986	1	0.84986	0.93	0.3443
ZCP	0.15610	1	0.15610	0.17	0.6830
[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1091.61220	1	1091.61220	209.44	0.0000
FOUR	9.07561	1	9.07561	1.74	0.1989
CLASS	13.96450	1	13.96450	2.68	0.1142
PLACE	0.04580	1	0.04580	0.01	0.9261
FC	1.86694	1	1.86694	0.36	0.5549
FP	0.37100	1	0.37100	0.07	0.7918
CP	0.65068	1	0.65068	0.12	0.7268
FCP	3.83767	1	3.83767	0.74	0.3990
ERROR	130.30000	25	5.21200		
J11	0.52466	1	0.52466	0.40	0.5312
JF	4.16694	1	4.16694	3.20	0.0857
JC	0.84986	1	0.84986	0.65	0.4266
JP	0.27751	1	0.27751	0.21	0.6482
JFC	0.06938	1	0.06938	0.05	0.8193
JFP	3.39946	1	3.39946	2.61	0.1186
JCP	0.00434	1	0.00434	0.00	0.9544
JFCP	0.52466	1	0.52466	0.40	0.5312
ERROR	32.53333	25	1.30133		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	52684.89133	1	52684.89133	161.00	0.0000
FOUR	381.83442	1	381.83442	1.17	0.2904
CLASS	0.06098	1	0.06098	0.00	0.9892
PLACE	471.47995	1	471.47995	1.44	0.2413
FC	212.25610	1	212.25610	0.65	0.4282
FP	144.81328	1	144.81328	0.44	0.5120
CP	5.54173	1	5.54173	0.02	0.8975
FCP	135.46043	1	135.46043	0.41	0.5258
ERROR	8180.90000	25	327.23600		
BT	1.64878	1	1.64878	0.06	0.8114
BF	157.35610	1	157.35610	5.55	0.0266
BC	0.24390	1	0.24390	0.01	0.9268
BP	34.73279	1	34.73279	1.22	0.2789
BFC	2.19512	1	2.19512	0.08	0.7831
BFP	20.94417	1	20.94417	0.74	0.3983

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	54712.01838	1	54712.01838	257.12	0.0000
FOUR	683.12525	1	683.12525	3.21	0.0858
CLASS	29.32831	1	29.32831	0.14	0.7137
PLACE	2257.36953	1	2257.36953	10.61	0.0033
FC	35.68709	1	35.68709	0.17	0.6858
FP	332.72067	1	332.72067	1.56	0.2232
CP	157.00006	1	157.00006	0.74	0.3989
FCP	132.09167	1	132.09167	0.62	0.4385
ERROR	5106.95833	24	212.78993		
OT	57.77411	1	57.77411	4.76	0.0391
OF	37.03365	1	37.03365	3.05	0.0933
OC	20.16342	1	20.16342	1.66	0.2095
OP	0.45961	1	0.45961	0.04	0.8473
OFC	53.02602	1	53.02602	4.37	0.0473
OFP	1.33747	1	1.33747	0.11	0.7427
OCP	2.51915	1	2.51915	0.21	0.6527
OFCP	87.22907	1	87.22907	7.19	0.0130
ERROR	291.05833	24	12.12743		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	10252.10083	1	10252.10083	369.44	0.0000
FOUR	24.84892	1	24.84892	0.90	0.3534
CLASS	3.81838	1	3.81838	0.14	0.7139
PLACE	308.16800	1	308.16800	11.11	0.0028
FC	0.99396	1	0.99396	0.04	0.8515
FP	16.61075	1	16.61075	0.60	0.4467
CP	38.60312	1	38.60312	1.39	0.2498
FCP	7.74816	1	7.74816	0.28	0.6021
ERROR	666.00833	24	27.75035		
VR	2.62144	1	2.62144	0.52	0.4766
VF	4.07182	1	4.07182	0.81	0.3764
VC	5.46113	1	5.46113	1.09	0.3070
VP	0.02296	1	0.02296	0.00	0.9466
VFC	0.37716	1	0.37716	0.08	0.7862
VFP	6.96953	1	6.96953	1.39	0.2499
VCP	4.81075	1	4.81075	0.96	0.3370
VFCP	0.45961	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	7014.69472	1	7014.69472	142.15	0.0000
FOUR	237.19854	1	237.19854	4.81	0.0383
CLASS	48.03823	1	48.03823	0.97	0.3337
PLACE	575.19396	1	575.19396	11.66	0.0023
FC	1.22907	1	1.22907	0.02	0.8759
FP	94.21686	1	94.21686	1.91	0.1798
CP	24.84892	1	24.84892	0.50	0.4848
FCP	42.25350	1	42.25350	0.86	0.3640
ERROR	1184.35833	24	49.34826		
VT	5.68709	1	5.68709	1.00	0.3279
VF	13.99243	1	13.99243	2.45	0.1303
VC	9.04128	1	9.04128	1.59	0.2201
VP	5.53594	1	5.53594	0.97	0.3343
VFC	15.08709	1	15.08709	2.65	0.1169
VFP	0.19243	1	0.19243	0.03	0.8558
VCP	0.75579	1	0.75579	0.13	0.7190
VFCP	66.31304	1	66.31304	11.63	0.0023
ERROR	136.85833	24	5.70243		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	2333.02392	1	2333.02392	171.90	0.0000
FOUR	21.84453	1	21.84453	1.61	0.2167
CLASS	2.29644	1	2.29644	0.17	0.6845
PLACE	49.71094	1	49.71094	3.66	0.0676
FC	19.94911	1	19.94911	1.47	0.2372
FP	25.56972	1	25.56972	1.88	0.1826
CP	3.72545	1	3.72545	0.27	0.6051
FCP	10.79796	1	10.79796	0.80	0.3813
ERROR	325.73333	24	13.57222		
VP	6.35216	1	6.35216	5.81	0.0239
VF	0.07354	1	0.07354	0.07	0.7976
VC	2.10712	1	2.10712	1.93	0.1778
VP	5.87888	1	5.87888	5.38	0.0292
VFC	8.61476	1	8.61476	7.88	0.0098
VFP	0.71476	1	0.71476	0.65	0.4267
VCP	3.36514	1	3.36514	3.08	0.0921
VFCP	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	33700.84922	1	33700.84922	46.33	0.0000
FOUR	1.48482	1	1.48482	0.00	0.9643
CLASS	2037.26278	1	2037.26278	2.80	0.1062
PLACE	1648.20346	1	1648.20346	2.27	0.1443
FC	19.76278	1	19.76278	0.03	0.8704
FP	403.05939	1	403.05939	0.55	0.4633
CP	38.35939	1	38.35939	0.05	0.8202
FCP	1061.52041	1	1061.52041	1.46	0.2379
ERROR	18914.60833	26	727.48494		
XS PS	68.51871	1	68.51871	0.39	0.5396
XF	16.74922	1	16.74922	0.09	0.7610
XC	0.21363	1	0.21363	0.00	0.9726
XP	1.00007	1	1.00007	0.01	0.9407
XFC	38.98651	1	38.98651	0.22	0.6430
XFP	0.00346	1	0.00346	0.00	0.9965
XCP	7.64414	1	7.64414	0.04	0.8371
XFCP	14.74922	1	14.74922	0.08	0.7753
ERROR	4609.30833	26	177.28109		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	385000.51024	1	385000.51024	529.19	0.0000
FOUR	0.13058	1	0.13058	0.00	0.9894
CLASS	2031.19838	1	2031.19838	2.79	0.1067
PLACE	1717.14414	1	1717.14414	2.36	0.1365
FC	25.84922	1	25.84922	0.04	0.8520
FP	433.30007	1	433.30007	0.60	0.4472
CP	63.60177	1	63.60177	0.09	0.7698
FCP	967.33058	1	967.33058	1.33	0.2594
ERROR	18915.70833	26	727.52724		
YS	91.94075	1	91.94075	0.55	0.4652
YF	27.05939	1	27.05939	0.16	0.6909
YC	1.87634	1	1.87634	0.01	0.9165
YP	5.34075	1	5.34075	0.03	0.8596
YFC	22.38482	1	22.38482	0.13	0.7175
YFP	1.10346	1	1.10346	0.01	0.9359
YCP	13.48651	1	13.48651	0.08	0.7788
YFCP	[illegible]				

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1.46441	1	1.46441	0.66	0.4236
FOUR	1.46441	1	1.46441	0.66	0.4236
CLASS	1.46441	1	1.46441	0.66	0.4236
PLACE	1.46441	1	1.46441	0.66	0.4236
FC	1.46441	1	1.46441	0.66	0.4236
FP	1.46441	1	1.46441	0.66	0.4236
CP	1.46441	1	1.46441	0.66	0.4236
FCP	1.46441	1	1.46441	0.66	0.4236
ERROR	57.60000	26	2.21538		
QA AS	1.46441	1	1.46441	0.66	0.4236
QF	1.46441	1	1.46441	0.66	0.4236
QC	1.46441	1	1.46441	0.66	0.4236
QP	1.46441	1	1.46441	0.66	0.4236
QFC	1.46441	1	1.46441	0.66	0.4236
QFP	1.46441	1	1.46441	0.66	0.4236
QCP	1.46441	1	1.46441	0.66	0.4236
QFCP	1.46441	1	1.46441	0.66	0.4236
ERROR	57.60000	26	2.21538		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	10461.38708	1	10461.38708	64.22	0.0000
FOUR	111.58538	1	111.58538	0.69	0.4154
CLASS	165.53397	1	165.53397	1.02	0.3227
PLACE	6993.10742	1	6993.10742	42.93	0.0000
FC	82.52549	1	82.52549	0.51	0.4829
FP	27.23453	1	27.23453	0.17	0.6860
CP	9.51194	1	9.51194	0.06	0.8110
FCP	159.11024	1	159.11024	0.98	0.3321
ERROR	4235.34167	26	162.89776		
VA PA	392.33397	1	392.33397	3.81	0.0617
VF	415.29838	1	415.29838	4.03	0.0551
VC	1.06843	1	1.06843	0.01	0.9196
VP	875.52549	1	875.52549	8.51	0.0072
VFC	0.00572	1	0.00572	0.00	0.9941
VFP	37.94414	1	37.94414	0.37	0.5490
VCP	0.01589	1	0.01589	0.00	0.9902
VFCP	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	4201.29725	1	4201.29725	24.70	0.0000
FOUR	315.90572	1	315.90572	1.86	0.1846
CLASS	319.50064	1	319.50064	1.88	0.1822
PLACE	36.91589	1	36.91589	0.22	0.6452
FC	136.25148	1	136.25148	0.80	0.3790
FP	2821.68369	1	2821.68369	16.59	0.0004
CP	93.23453	1	93.23453	0.55	0.4657
FCP	251.46674	1	251.46674	1.48	0.2350
ERROR	4422.67500	26	170.10288		
YA AA	1033.23623	1	1033.23623	5.65	0.0252
YF	101.18708	1	101.18708	0.55	0.4638
YC	11.24301	1	11.24301	0.06	0.8062
YP	473.37013	1	473.37013	2.59	0.1199
YFC	3.96674	1	3.96674	0.02	0.8841
YFP	418.04301	1	418.04301	2.28	0.1428
YCP	0.00064	1	0.00064	0.00	0.9985
YFCP	1.78538	1	1.78538	0.01	0.9221
ERROR	4758.67500	26	183.02596		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	27518.89831	1	27518.89831	80.99	0.0000
FOUR	36.00254	1	36.00254	0.11	0.7474
CLASS	14.42825	1	14.42825	0.04	0.8383
PLACE	8264.76864	1	8264.76864	24.32	0.0000
FC	382.08164	1	382.08164	1.12	0.2987
FP	2411.88814	1	2411.88814	7.10	0.0131
CP	60.55621	1	60.55621	0.18	0.6764
FCP	881.00452	1	881.00452	2.59	0.1194
ERROR	8834.61667	26	339.79295		
TA	123.79774	1	123.79774	0.35	0.5600
TF	1001.60706	1	1001.60706	2.82	0.1050
TC	1.23051	1	1.23051	0.00	0.9535
TP	2513.64096	1	2513.64096	7.08	0.0132
TFC	0.73475	1	0.73475	0.00	0.9641
TFP	240.13672	1	240.13672	0.68	0.4183
TCP	1.12119	1	1.12119	0.00	0.9556
TFCP	7.41356	1	7.41356	[illegible]	

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6807.42401	1	6807.42401	21.19	0.0001
FOUR	42.08927	1	42.08927	0.13	0.7203
CLASS	38.04774	1	38.04774	0.12	0.7335
PLACE	597.20791	1	597.20791	1.86	0.1845
FC	458.49605	1	458.49605	1.43	0.2431
FP	12.57655	1	12.57655	0.04	0.8447
CP	9.35706	1	9.35706	0.03	0.8658
FCP	844.47486	1	844.47486	2.63	0.1170
ERROR	8354.28333	26	321.31859		
IP	17.37401	1	17.37401	0.16	0.6953
IF	36.81384	1	36.81384	0.33	0.5692
IC	3.80113	1	3.80113	0.03	0.8545
IP	130.23757	1	130.23757	1.18	0.2881
IFC	97.33588	1	97.33588	0.88	0.3571
IFP	43.40791	1	43.40791	0.39	0.5367
ICP	16.95621	1	16.95621	0.15	0.6988
IFCP	31.13672	1	31.13672	0.28	0.6004
ERROR	2879.28333	26	110.74167		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	11.75593	1	11.75593	1.22	0.2801
FOUR	1.01695	1	1.01695	0.11	0.7482
CLASS	1.01695	1	1.01695	0.11	0.7482
PLACE	11.75593	1	11.75593	1.22	0.2801
FC	11.75593	1	11.75593	1.22	0.2801
FP	1.01695	1	1.01695	0.11	0.7482
CP	1.01695	1	1.01695	0.11	0.7482
FCP	11.75593	1	11.75593	1.22	0.2801
ERROR	251.20000	26	9.66154		
IG	1.01695	1	1.01695	0.11	0.7482
IF	11.75593	1	11.75593	1.22	0.2801
IC	11.75593	1	11.75593	1.22	0.2801
IP	1.01695	1	1.01695	0.11	0.7482
IFC	1.01695	1	1.01695	0.11	0.7482
IFP	11.75593	1	11.75593	1.22	0.2801
ICP	11.75593	1	11.75593	1.22	0.2801
IFCP	1.01695	1	1.01695	0.11	0.7482

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1234.51702	1	1234.51702	34.36	0.0000
FOUR	58.09668	1	58.09668	1.62	0.2148
CLASS	276.58482	1	276.58482	7.70	0.0101
PLACE	129.66278	1	129.66278	3.61	0.0686
FC	28.47634	1	28.47634	0.79	0.3815
FP	15.53397	1	15.53397	0.43	0.5166
CP	13.48651	1	13.48651	0.38	0.5454
FCP	86.85600	1	86.85600	2.42	0.1321
ERROR	934.10833	26	35.92724		
IS	118.06843	1	118.06843	2.22	0.1486
IF	35.70064	1	35.70064	0.67	0.4204
IC	94.21081	1	94.21081	1.77	0.1951
IP	63.87013	1	63.87013	1.20	0.2836
IFC	0.53453	1	0.53453	0.01	0.9210
IFP	0.61081	1	0.61081	0.01	0.9155
ICP	15.66674	1	15.66674	0.29	0.5922
IFCP	31.60742	1	31.60742	0.59	0.4481
ERROR	1385.07500	26	53.27212		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1659.82373	1	1659.82373	7.78	0.0090
FOUR	74.34153	1	74.34153	0.35	0.5601
CLASS	336.85424	1	336.85424	1.58	0.2201
PLACE	11.41271	1	11.41271	0.05	0.8169
FC	178.53814	1	178.53814	0.84	0.3687
FP	315.01017	1	315.01017	1.48	0.2352
CP	13.54831	1	13.54831	0.06	0.8030
FCP	0.04068	1	0.04068	0.00	0.9891
ERROR	5546.55000	26	213.32885		
IO	244.32203	1	244.32203	4.27	0.0488
IF	10.07068	1	10.07068	0.18	0.6779
IC	18.80339	1	18.80339	0.33	0.5713
IP	85.14153	1	85.14153	1.49	0.2333
IFC	160.17203	1	160.17203	2.80	0.1062
IFP	91.77966	1	91.77966	1.61	0.2164
ICP	4.70085	1	4.70085	0.08	0.7766
IFCP	[illegible]	1	[illegible]	[illegible]	[illegible]

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	413229.66356	1	413229.66356	630.79	0.0000
FOUR	16.68051	1	16.68051	0.03	0.8745
CLASS	1669.42401	1	1669.42401	2.55	0.1225
PLACE	404.74831	1	404.74831	0.62	0.4390
FC	0.10198	1	0.10198	0.00	0.9901
FP	349.93475	1	349.93475	0.53	0.4714
CP	21.36299	1	21.36299	0.03	0.8581
FCP	1204.58333	1	1204.58333	1.84	0.1868
ERROR	17032.56667	26	655.09872		
IN	96.34350	1	96.34350	0.44	0.5153
IF	0.00113	1	0.00113	0.00	0.9982
IC	14.17401	1	14.17401	0.06	0.8023
IP	122.30621	1	122.30621	0.55	0.4641
IFC	10.19774	1	10.19774	0.05	0.8318
IFP	30.39096	1	30.39096	0.14	0.7141
ICP	34.60452	1	34.60452	0.16	0.6959
IFCP	226.78418	1	226.78418	1.02	0.3209
ERROR	5758.33333	26	221.47436		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6382.98369	1	6382.98369	16.15	0.0004
FOUR	84.67691	1	84.67691	0.21	0.6473
CLASS	2.63538	1	2.68538	0.01	0.9349
PLACE	334.08369	1	334.08369	0.85	0.3664
FC	712.80572	1	712.80572	1.80	0.1909
FP	151.98369	1	151.98369	0.38	0.5406
CP	1023.53453	1	1023.53453	2.59	0.1197
FCP	2.06504	1	2.06504	0.01	0.9429
ERROR	10277.27500	26	395.27981		
AP	22.38482	1	22.38482	0.24	0.6274
AF	505.34075	1	505.34075	5.45	0.0276
AC	281.63905	1	281.63905	3.04	0.0933
AP	0.13058	1	0.13058	0.00	0.9704
AFC	3.44922	1	3.44922	0.04	0.8486
AFP	327.96787	1	327.96787	3.53	0.0713
ACP	40.46956	1	40.46956	0.44	0.5148

Breakdown ANOVA Tables for Experiment 4

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

OT (class)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	27577.55054	1	27577.55054	131.12	0.0000
FOUR	214.74409	1	214.74409	1.02	0.3322
PLACE	1904.26022	1	1904.26022	9.05	0.0109
FP	467.00215	1	467.00215	2.22	0.1620
ERROR	2523.93333	12	210.32778		
OT	77.22634	1	77.22634	6.66	0.0241
OF	94.38763	1	94.38763	8.13	0.0146
OP	2.71022	1	2.71022	0.23	0.6376
OFP	58.19409	1	58.19409	5.02	0.0448
ERROR	139.23333	12	11.60278		

OT (no class)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	27184.78370	1	27184.78370	126.29	0.0000
FOUR	489.39239	1	489.39239	2.27	0.1575
PLACE	580.82717	1	580.82717	2.70	0.1264
FP	21.60978	1	21.60978	0.10	0.7568
ERROR	2583.02500	12	215.25208		
OT	4.59239	1	4.59239	0.36	0.5581
OF	0.67935	1	0.67935	0.05	0.8207
OP	0.39239	1	0.39239	0.03	0.8631
OFP	31.78370	1	31.78370	2.51	0.1390
ERROR	151.82500	12	12.65208		

OT (Class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	21300.50417	1	21300.50417	169.29	0.0000
FOUR	637.00417	1	637.00417	5.06	0.0654
ERROR	754.93333	6	125.82222		
OT	24.70417	1	24.70417	2.40	0.1722
OF	145.70417	1	145.70417	14.16	0.0094
ERROR	61.73333	6	10.28889		

OT (no class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	14667.77857	1	14667.77857	75.48	0.0003
FOUR	294.35000	1	294.35000	1.51	0.2732
ERROR	971.65000	5	194.33000		
OT	3.15000	1	3.15000	0.16	0.7090
OF	17.15000	1	17.15000	0.85	0.3988
ERROR	100.85000	5	20.17000		

OT (Home)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	35049.56802	1	35049.56802	223.30	0.0000
FOUR	871.56802	1	871.56802	5.55	0.0381
CLASS	22.40045	1	22.40045	0.14	0.7128
FC	13.48153	1	13.48153	0.09	0.7749
ERROR	1726.58333	11	156.96212		
OT	21.21126	1	21.21126	1.44	0.2561
OF	23.21126	1	23.21126	1.57	0.2361
OC	3.73018	1	3.73018	0.25	0.6253
OFC	122.27072	1	122.27072	8.27	0.0151
ERROR	162.58333	11	14.78030		

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OT (Hospital)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	19961.87500	1	19961.87500	76.77	0.0000
FOUR	35.82237	1	35.82237	0.14	0.7165
CLASS	185.03289	1	185.03289	0.71	0.4142
FC	175.29605	1	175.29605	0.67	0.4264
ERROR	3380.37500	13	260.02885		
OT	39.38026	1	39.38026	3.98	0.0673
OF	13.95921	1	13.95921	1.41	0.2559
OC	21.22237	1	21.22237	2.15	0.1666
OFC	2.43289	1	2.43289	0.25	0.6281
ERROR	128.47500	13	9.88269		

VP (class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1353.10458	1	1353.10458	72.29	0.0000
FOUR	0.16340	1	0.16340	0.01	0.9268
ERROR	280.77778	15	18.71852		
VP	1.19118	1	1.19118	1.13	0.3037
VF	3.30882	1	3.30882	3.15	0.0962
ERROR	15.75000	15	1.05000		

VP (no class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1283.82521	1	1283.82521	134.61	0.0000
FOUR	69.94286	1	69.94286	7.33	0.0162
ERROR	143.05714	15	9.53714		
VP	4.54454	1	4.54454	3.17	0.0953
VF	2.42689	1	2.42689	1.69	0.2130
ERROR	21.51429	15	1.43429		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

VT (Hospital)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	2052.63289	1	2052.63289	40.32	0.0000
FOUR	18.63289	1	18.63289	0.37	0.5556
CLASS	81.58026	1	81.58026	1.60	0.2278
FC	33.26447	1	33.26447	0.65	0.4334
ERROR	661.77500	13	50.90577		
VT	12.89605	1	12.89605	3.09	0.1023
VF	6.26447	1	6.26447	1.50	0.2423
VC	8.63289	1	8.63289	2.07	0.1741
VFC	10.42237	1	10.42237	2.50	0.1381
ERROR	54.27500	13	4.17500		

VT (Home)

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	5136.99505	1	5136.99505	108.13	0.0000
FOUR	278.99505	1	278.99505	5.87	0.0338
CLASS	1.67613	1	1.67613	0.04	0.8544
FC	12.86532	1	12.86532	0.27	0.6131
ERROR	522.58333	11	47.50758		
VT	0.00045	1	0.00045	0.00	0.9940
VF	7.73018	1	7.73018	1.03	0.3320
VC	2.02207	1	2.02207	0.27	0.6141
VFC	64.02207	1	64.02207	8.53	0.0139
ERROR	82.58333	11	7.50758		

F7 (class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	330.62500	1	330.62500	38.48	0.0000
FOUR	81.22500	1	81.22500	9.45	0.0065
ERROR	154.65000	18	8.59167		
R7	2.02500	1	2.02500	0.62	0.4430
RF	1.22500	1	1.22500	0.37	0.5495
ERROR	59.25000	18	3.29167		

F7 (no class)

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD4

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	160.55556	1	160.55556	31.71	0.0000
FOUR	0.55556	1	0.55556	0.11	0.7447
ERROR	81.00000	16	5.06250		
R7	0.67222	1	0.67222	1.13	0.3043
RF	2.00556	1	2.00556	3.36	0.0855
ERROR	9.55000	16	0.59687		

Appendix 15

ANOVA Tables for Experiment 5

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	13252.15135	1	13252.15135	308.06	0.0000
FOUR	446.85405	1	446.85405	10.39	0.0081
CLASS	14.59459	1	14.59459	0.34	0.5720
FC	103.78378	1	103.78378	2.41	0.1486
ERROR	473.20000	11	43.01818		
GT	2.88288	1	2.88288	0.13	0.7245
GF	0.18018	1	0.18018	0.01	0.9296
GC	0.00721	1	0.00721	0.00	0.9859
GFC	0.11532	1	0.11532	0.01	0.9436
ERROR	242.53333	11	22.04848		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	524.43288	1	524.43288	80.59	0.0000
FOUR	16.43288	1	16.43288	2.53	0.1403
CLASS	15.75180	1	15.75180	2.42	0.1480
FC	36.07613	1	36.07613	5.54	0.0382
ERROR	71.58333	11	6.50758		
AL	0.55180	1	0.55180	0.41	0.5348
AF	0.55180	1	0.55180	0.41	0.5348
AC	0.75721	1	0.75721	0.56	0.4686
AFC	0.43288	1	0.43288	0.32	0.5817
ERROR	14.78333	11	1.34394		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3411.48829	1	3411.48829	116.06	0.0000
FOUR	145.32613	1	145.32613	4.94	0.0481
CLASS	1.84505	1	1.84505	0.06	0.8068
FC	4.87207	1	4.87207	0.17	0.6917
ERROR	323.33333	11	29.39394		
WA	1.41261	1	1.41261	0.21	0.6568
WF	0.11532	1	0.11532	0.02	0.8986
WC	0.72072	1	0.72072	0.11	0.7504
WFC	2.88288	1	2.88288	0.43	0.5276
ERROR	74.53333	11	6.77576		

ANALYSIS OF VARIANCE FOR .1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	16.77883	1	16.77883	4.83	0.0502
FOUR	0.61667	1	0.61667	0.18	0.6815
CLASS	4.77883	1	4.77883	1.38	0.2654
FC	2.02207	1	2.02207	0.58	0.4614
ERROR	38.18333	11	3.47121		
AD	1.26532	1	1.26532	3.04	0.1092
AF	0.13018	1	0.13018	0.31	0.5874
AC	0.05450	1	0.05450	0.13	0.7244
AFC	0.00045	1	0.00045	0.00	0.9744
ERROR	4.58333	11	0.41667		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	94.48829	1	94.48829	28.61	0.0002
FOUR	1.51532	1	1.51532	0.46	0.5122
CLASS	0.08829	1	0.08829	0.03	0.8731
FC	3.98018	1	3.98018	1.21	0.2958
ERROR	36.33333	11	3.30303		
A1	2.08288	1	2.08288	3.74	0.0794
AF	0.46126	1	0.46126	0.83	0.3826
AC	0.18018	1	0.18018	0.32	0.5811
AFC	0.72072	1	0.72072	1.29	0.2797
ERROR	6.13333	11	0.55758		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	162.70315	1	162.70315	39.26	0.0001
FOUR	1.08153	1	1.08153	0.26	0.6195
CLASS	5.75180	1	5.75180	1.39	0.2636
FC	8.45450	1	8.45450	2.04	0.1810
ERROR	45.58333	11	4.14394		
R2	0.19865	1	0.19865	0.13	0.7240
RF	2.14459	1	2.14459	1.42	0.2590
RC	2.14459	1	2.14459	1.42	0.2590
RFC	0.19865	1	0.19865	0.13	0.7240
ERROR	16.65000	11	1.51364		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	224.52072	1	224.52072	43.53	0.0000
FOUR	10.68288	1	10.68288	2.07	0.1779
CLASS	19.11532	1	19.11532	3.71	0.0804
FC	29.06126	1	29.06126	5.63	0.0369
ERROR	56.73333	11	5.15758		
R3	1.12613	1	1.12613	2.41	0.1486
RF	1.12613	1	1.12613	2.41	0.1486
RC	0.00180	1	0.00180	0.00	0.9516
RFC	0.21802	1	0.21802	0.47	0.5084
ERROR	5.13333	11	0.46667		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	57.73153	1	57.73153	58.08	0.0000
FOUR	3.02883	1	3.02883	3.05	0.1087
CLASS	1.73153	1	1.73153	1.74	0.2137
FC	4.32613	1	4.32613	4.35	0.0610
ERROR	10.93333	11	0.99394		
R4	1.84505	1	1.84505	4.29	0.0627
RF	2.60180	1	2.60180	6.05	0.0317
RC	1.41261	1	1.41261	3.28	0.0974
RFC	0.87207	1	0.87207	2.03	0.1823
ERROR	4.73333	11	0.43030		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	98.23829	1	98.23829	32.37	0.0001
FOUR	0.61667	1	0.61667	0.20	0.6609
CLASS	1.90315	1	1.90315	0.63	0.4452
FC	1.36261	1	1.36261	0.45	0.5166
ERROR	33.38333	11	3.03485		
R5	0.01126	1	0.01126	0.03	0.8724
RF	0.01126	1	0.01126	0.03	0.8724
RC	0.28153	1	0.28153	0.68	0.4285
RFC	0.28153	1	0.28153	0.68	0.4285
ERROR	4.58333	11	0.41667		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	68.51351	1	68.51351	67.29	0.0000
FOUR	0.40541	1	0.40541	0.40	0.5409
CLASS	1.31351	1	1.31351	1.29	0.2802
FC	0.01622	1	0.01622	0.02	0.9019
ERROR	11.20000	11	1.01818		
R6	0.25946	1	0.25946	0.95	0.3503
RF	0.25946	1	0.25946	0.95	0.3503
RC	0.06486	1	0.06486	0.24	0.6353
RFC	0.06486	1	0.06486	0.24	0.6353
ERROR	3.00000	11	0.27273		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	90.81126	1	90.81126	43.84	0.0000
FOUR	4.59505	1	4.59505	2.22	0.1645
CLASS	3.25450	1	3.25450	1.57	0.2360
FC	9.47072	1	9.47072	4.57	0.0558
ERROR	22.78333	11	2.07121		
R7	0.03649	1	0.03649	0.07	0.7911
RF	0.19865	1	0.19865	0.40	0.5395
RC	0.91216	1	0.91216	1.84	0.2020
RFC	0.10135	1	0.10135	0.20	0.6599
ERROR	5.45000	11	0.49545		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	244.67072	1	244.67072	86.31	0.0000
FOUR	1.26532	1	1.26532	0.45	0.5178
CLASS	4.23829	1	4.23829	1.50	0.2470
FC	7.96802	1	7.96802	2.81	0.1218
ERROR	31.18333	11	2.83485		
R8	3.56802	1	3.56802	4.47	0.0582
RF	0.16261	1	0.16261	0.20	0.6606
RC	0.28153	1	0.28153	0.35	0.5647
RFC	0.55180	1	0.55180	0.69	0.4235

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	188.56261	1	188.56261	41.83	0.0000
FOUR	4.23829	1	4.23829	0.94	0.3530
CLASS	2.81126	1	2.81126	0.62	0.4464
FC	10.27072	1	10.27072	2.28	0.1594
ERROR	49.58333	11	4.50758		
R9	0.16261	1	0.16261	0.24	0.6367
RF	0.37883	1	0.37883	0.55	0.4740
RC	3.10315	1	3.10315	4.50	0.0574
RFC	0.07613	1	0.07613	0.11	0.7459
ERROR	7.58333	11	0.68939		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	380.43288	1	380.43288	124.61	0.0000
FOUR	0.43288	1	0.43288	0.14	0.7137
CLASS	4.23829	1	4.23829	1.39	0.2636
FC	0.99505	1	0.99505	0.33	0.5795
ERROR	33.58333	11	3.05303		
R10	0.00045	1	0.00045	0.00	0.9839
RF	1.08153	1	1.08153	1.03	0.3326
RC	0.02207	1	0.02207	0.02	0.8875
RFC	0.13018	1	0.13018	0.12	0.7318
ERROR	11.58333	11	1.05303		

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SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	517.65045	1	517.65045	187.72	0.0000
FOUR	3.48829	1	3.48829	1.26	0.2847
CLASS	2.60180	1	2.60180	0.94	0.3523
FC	0.00721	1	0.00721	0.00	0.9601
ERROR	30.33333	11	2.75758		
R11	0.58378	1	0.58378	0.19	0.6695
RF	0.58378	1	0.58378	0.19	0.6695
RC	0.25946	1	0.25946	0.09	0.7755
RFC	4.15135	1	4.15135	1.37	0.2670

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	20853.34054	1	20853.34054	179.43	0.0000
FOUR	70.63784	1	70.63784	0.61	0.4521
CLASS	50.85405	1	50.85405	0.44	0.5219
FC	549.01622	1	549.01622	4.72	0.0525
ERROR	1278.40000	11	116.21818		
RT	0.46126	1	0.46126	0.03	0.8749
RF	61.00180	1	61.00180	3.44	0.0908
RC	0.87207	1	0.87207	0.05	0.8287
RFC	6.92613	1	6.92613	0.39	0.5450
ERROR	195.33333	11	17.75758		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	37860.42400	1	37860.42400	224.74	0.0000
FOUR	952.27475	1	952.27475	5.65	0.0367
CLASS	0.06580	1	0.06580	0.00	0.9846
FC	30.72251	1	30.72251	0.18	0.6776
ERROR	1853.10833	11	168.46439		
OT	10.38818	1	10.38818	0.70	0.4193
OF	153.52251	1	153.52251	10.40	0.0081
OC	7.22400	1	7.22400	0.49	0.4986
OFC	33.76132	1	33.76132	2.29	0.1586
ERROR	162.30833	11	14.75530		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	5710.71841	1	5710.71841	109.07	0.0000
FOUR	308.92736	1	308.92736	5.90	0.0335
CLASS	6.24080	1	6.24080	0.12	0.7364
FC	0.50945	1	0.50945	0.01	0.9232
ERROR	575.93333	11	52.35758		
VT	6.69453	1	6.69453	0.86	0.3748
VF	40.12736	1	40.12736	5.13	0.0447
VC	10.31642	1	10.31642	1.32	0.2752
VFC	0.28657	1	0.28657	0.04	0.8517
ERROR	86.06667	11	7.82424		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1308.89751	1	1308.89751	298.30	0.0000
FOUR	72.59900	1	72.59900	16.55	0.0019
CLASS	0.87761	1	0.87761	0.20	0.6634
FC	0.87761	1	0.87761	0.20	0.6634
ERROR	48.26667	11	4.38788		
VP	0.09751	1	0.09751	0.05	0.8355
VF	4.39602	1	4.39602	2.04	0.1812
VC	1.05274	1	1.05274	0.49	0.4994
VFC	11.79900	1	11.79900	5.47	0.0393
ERROR	23.73333	11	2.15758		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	6532.21505	1	6532.21505	373.38	0.0000
FOUR	45.82699	1	45.82699	2.62	0.1338
CLASS	10.97127	1	10.97127	0.63	0.4452
FC	10.97127	1	10.97127	0.63	0.4452
ERROR	192.44167	11	17.49470		
VR	11.57027	1	11.57027	1.97	0.1884
VF	41.12251	1	41.12251	6.99	0.0228
VC	8.73445	1	8.73445	1.48	0.2485
VFC	0.37624	1	0.37624	0.06	0.8050
ERROR	64.70833	11	5.88258		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	14268.00043	1	14268.00043	30.16	0.0003
FOUR	1357.76667	1	1357.76667	2.87	0.1211
CLASS	898.90952	1	898.90952	1.90	0.1981
FC	121.14329	1	121.14329	0.26	0.6238
ERROR	4730.98333	10	473.09833		
XS PS	1227.64329	1	1227.64329	4.68	0.0558
XF	462.83810	1	462.83810	1.76	0.2135
XC	16.29264	1	16.29264	0.06	0.8082
XFC	190.86407	1	190.86407	0.73	0.4136
ERROR	[illegible]	[illegible]	[illegible]		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	143614.63030	1	143614.63030	310.69	0.0000
FOUR	1334.86407	1	1334.86407	2.89	0.1201
CLASS	843.64329	1	843.64329	1.83	0.2065
FC	114.37056	1	114.37056	0.25	0.6297
ERROR	4622.48333	10	462.24833		
YS NS	1213.10649	1	1213.10649	4.70	0.0554
YF	471.83377	1	471.83377	1.83	0.2063
YC	18.01558	1	18.01558	0.07	0.7971
YFC	185.15844	1	185.15844	0.72	0.4170
ERROR	2583.15000	10	258.31500		
SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	0.00000	1	0.00000	0.00	1.0000
FOUR	0.00000	1	0.00000	0.00	1.0000
CLASS	0.00000	1	0.00000	0.00	1.0000
FC	0.00000	1	0.00000	0.00	1.0000
ERROR	0.00000	10	0.00000		
QA AS	0.00000	1	0.00000	0.00	1.0000
QF	0.00000	1	0.00000	0.00	1.0000
QC	0.00000	1	0.00000	0.00	1.0000
QFC	0.00000	1	0.00000	0.00	1.0000
ERROR	0.00000	10	0.00000		
SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	10816.01829	1	10816.01829	29.30	0.0003
FOUR	7.14816	1	7.14816	0.02	0.8921
CLASS	115.48582	1	115.48582	0.31	0.5882
FC	864.92738	1	864.92738	2.34	0.1568
ERROR	3691.35833	10	369.13583		
PA	802.45985	1	802.45985	5.01	0.0491
PF	299.30400	1	299.30400	1.87	0.2015
PC	137.45985	1	137.45985	0.86	0.3760
PFC	0.30400	1	0.30400	0.00	0.9661
ERROR	1601.35833	10	160.13583		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1529.22955	1	1529.22955	7.15	0.0233
FOUR	1529.22955	1	1529.22955	7.15	0.0233
CLASS	191.15162	1	191.15162	0.89	0.3667
FC	191.15162	1	191.15162	0.89	0.3667
ERROR	2137.97500	10	213.79750		
YA AA	2.73604	1	2.73604	0.02	0.8992
YF	2.73604	1	2.73604	0.02	0.8992
YC	1.33344	1	1.33344	0.01	0.9295
YFC	1.33344	1	1.33344	0.01	0.9295
ERROR	1619.97500	10	161.99750		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	20479.17056	1	20479.17056	26.81	0.0004
FOUR	1745.48225	1	1745.48225	2.28	0.1616
CLASS	9.48225	1	9.48225	0.01	0.9135
FC	1869.30043	1	1869.30043	2.45	0.1488
ERROR	7639.68333	10	763.96833		
TA	711.48225	1	711.48225	1.30	0.2816
TF	244.80693	1	244.80693	0.45	0.5195
TC	111.71602	1	111.71602	0.20	0.6616
TFC	2.91082	1	2.91082	0.01	0.9434
ERROR	5491.68333	10	549.16833		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1961.26071	1	1961.26071	12.56	0.0053
FOUR	66.35162	1	66.35162	0.42	0.5292
CLASS	21.62435	1	21.62435	0.14	0.7176
FC	317.57240	1	317.57240	2.03	0.1843
ERROR	1561.77500	10	156.17750		
IP	16.54556	1	16.54556	0.19	0.6752
IF	110.18193	1	110.18193	1.24	0.2915
IC	0.67543	1	0.67543	0.01	0.9322
IFC	13.94816	1	13.94816	0.16	0.7002
ERROR	[illegible]				

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	3.05455	1	3.05455	0.39	0.5465
FOUR	3.05455	1	3.05455	0.39	0.5465
CLASS	3.05455	1	3.05455	0.39	0.5465
FC	3.05455	1	3.05455	0.39	0.5465
ERROR	78.40000	10	7.84000		
IG	3.05455	1	3.05455	0.39	0.5465
IF	3.05455	1	3.05455	0.39	0.5465
IC	3.05455	1	3.05455	0.39	0.5465
IFC	3.05455	1	3.05455	0.39	0.5465
ERROR	78.40000	10	7.84000		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1571.00649	1	1571.00649	28.97	0.0003
FOUR	519.05844	1	519.05844	9.57	0.0114
CLASS	294.64286	1	294.64286	5.43	0.0420
FC	0.09740	1	0.09740	0.00	0.9670
ERROR	542.25000	10	54.22500		
IS	31.55844	1	31.55844	0.28	0.6058
IF	24.93506	1	24.93506	0.22	0.6460
IC	56.10390	1	56.10390	0.50	0.4937
IFC	47.14286	1	47.14286	0.42	0.5296
ERROR	1111.75000	10	111.17500		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1020.01082	1	1020.01082	5.82	0.0366
FOUR	346.76407	1	346.76407	1.98	0.1900
CLASS	18.19264	1	18.19264	0.10	0.7540
FC	6.76407	1	6.76407	0.04	0.8482
ERROR	1753.83333	10	175.38333		
IO	470.93030	1	470.93030	4.24	0.0666
IF	545.94329	1	545.94329	4.91	0.0510
IC	35.65758	1	35.65758	0.32	0.5836
IFC	53.94329	1	53.94329	0.49	0.5019
ERROR	1111.43333	10	111.14333		

ANALYSIS OF VARIANCE FOR 1-ST
DEPENDENT VARIABLE - AD3 AD5

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	1966.79318	1	1966.79318	6.94	0.0250
FOUR	31.91006	1	31.91006	0.11	0.7442
CLASS	274.63734	1	274.63734	0.97	0.3483
FC	489.62435	1	489.62435	1.73	0.2182
ERROR	2835.77500	10	283.57750		
AP	1.48149	1	1.48149	0.04	0.8488
AF	75.81916	1	75.81916	1.96	0.1917
AC	12.00097	1	12.00097	0.31	0.5898
AFC	16.20877	1	16.20877	0.42	0.5320
ERROR	386.77500	10	38.67750		

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F	TAIL PROBABILITY
MEAN	145013.63907	1	145013.63907	331.84	0.0000
FOUR	1203.70400	1	1203.70400	2.75	0.1280
CLASS	723.18452	1	723.18452	1.65	0.2273
FC	165.06764	1	165.06764	0.38	0.5525
ERROR	4369.95833	10	436.99583		
IN	1084.11526	1	1084.11526	5.41	0.0424
IF	392.75162	1	392.75162	1.96	0.1919
IC	7.03734	1	7.03734	0.04	0.8552
IFC	144.37500	1	144.37500	0.72	0.4160
ERROR	2005.62500	10	200.56250		

Appendix 16

Attitude of alert residents to the mentally impaired in a Local Authority Home for the Elderly.

I.G. Hanley, Research Psychologist, Royal Edinburgh Hospital.
J.M. Rylands, Psychologist, Department of Psychiatry, University of Edinburgh.

SUMMARY Many issues require consideration in evaluating the care provided in Local Authority Homes for the Elderly in Scotland. This paper considers the attitude of alert residents to (1) the mentally impaired residents they live with; and (2) attempts to help the mentally impaired with a Reality Orientation programme. Change in attitude was sought by providing an education programme for a sample of alert residents.

INTRODUCTION

Masterton et al (1979) have pointed out that with no provision of Special Local Authority Homes for the elderly mentally infirm ('EMI' Homes) in Scotland, residential homes have found it increasingly difficult to care for and contain their growing numbers of dependant and behaviourally disturbed residents. In the 11 Local Authority Homes within the catchment area of Gartnavel Royal Hospital, Masterton et al (1979) identified clear evidence of dementia in 27.1% of the residents and some evidence of cerebral impairment in a further 39.3%. The purpose of this study is to identify the attitude of alert or unimpaired residents towards (a) the mentally impaired; and (b) a reality orientation programme introduced to help the mentally impaired, in a large local Authority Home in Edinburgh.

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The need for such a study became clear about a year after reality orientation had been introduced to the home. The success of this programme has been reported elsewhere (Hanley et al, 1981[a], Hanley et al, 1981[b]). However, although mentally impaired residents benefitted from RO, and care staff were enthusiastic about the programme, a number of alert residents seemed less than content. They complained that the mentally impaired residents were a nuisance and received an unfair proportion of staff attention. Although unpublished data from the study indicates that there was no change in the frequency of staff to mentally impaired resident interactions following the introduction of Twenty-four Hour RO there was a supplementary Class RO session provided daily for mentally impaired residents only.

In addition to measuring the attitudes of alert residents it was decided to try and modify these attitudes with an educational programme designed to explain the reasons for behavioural disturbance in the mentally impaired and the rationale and purpose of the RO programme. It was hoped that this would also provide information on how the alert elderly perceive RO rehabilitation programmes, some elements of which are visible to all, e.g. the provision of orientation aids such as notice boards, calendars and signposts in the living environment. Other studies by Kahana and Coe (1969) and Kosberg and Gorman (1975) have shown that elderly home residents show a generally negative attitude towards rehabilitation efforts.

METHOD

A 17-item questionnaire was developed to ascertain the attitude of the alert residents towards (a) the mentally impaired; and (b) selected aspects of the RO programme. Ten items related to either the RO programme directly or the concept of applying special efforts to help the mentally impaired. Seven items related to views about the mentally impaired residents themselves. This was administered verbally to sixteen alert residents of Greenlea Old People's Home after the purpose of the questioning had been explained. Residents were asked to indicate whether they strongly agreed, agreed, disagreed or strongly disagreed with each statement. Statements were explained to residents when this was necessary for their comprehension. Polarity of items was mixed.

Following the initial administration of the questionnaire, an information and education programme was implemented for six of the alert residents who were considered by supervisory staff to complain most about the behaviour of mentally impaired residents. The practicality of this selection procedure was considered to outweigh the advantages of random allocation to experimental and control groups. The education programme consisted of (a) an individual interview with each of the six residents in which the effects of ageing in general were discussed and some common physical and mental complaints explained. The explanations were simple and straightforward and designed solely to emphasis that for some elderly people the brain "doesn't work" as well as it used to and this affects memory and the capacity to organize one's life and interact socially with others. Examples of confused behaviour common in the home were used as illustrations and it was pointed out that such behaviour was not done intentionally or deliberately, as some alert residents seemed to believe. The purpose of the RO programme was explained simply as an attempt to remind confused residents of relevant information and provide memory aids such as signposts and calendars. Each resident was given a copy of the Scottish Health Education Unit brochure on "Forgetfulness and the elderly" and invited to attend a class RO session and see for themselves what was going on; (b) four meetings for the group of six were arranged with the administrator of the home and the section supervisor. In these the residents were encouraged to ventilate their feelings about the residents that upset them; (c) attendance for each of the six at a class RO session followed by a chance to discuss their reactions to what went on in this session.

Following the education programme which was spread over a three week period, the questionnaire was readministered with twelve of the original sixteen residents: two had to be dropped because of illness and two pretest questionnaires had been mislaid.

RESULTS

Tables 1 and 2 show the percentage of all residents who agreed or disagreed with each of the questionnaire items on pretest. For purposes of this table all items have the same polarity with agreement indicating a negative attitude.

Table 1 Percentage of alert residents (N = 12) agreeing and disagreeing with each item (R) related to reactions to mentally impaired residents.

	Agree	Disagree
1. It is best for all concerned if the mentally confused have absolutely no contact with other residents (R)	50	50
2. Confused residents are really very annoying (R)	92	8
3. It is difficult to remain patient with the confused residents (R)	67	33
4. The other residents would be much happier if the confused residents were not around (R)	67	33
5. Staff should make more efforts to understand the wishes of the normal residents instead of wasting their time with the confused residents (R)	50	50
6. Confused residents should be removed from Greenlea and placed in a hospital (R)	58	42
7. Life would be more pleasant at Greenlea if there were no confused residents (R)	75	25

Table 2 Percentage of alert residents (N = 12) agreeing and disagreeing with each item (S) related to special provisions for mentally impaired residents

	Agree	Disagree
1. Special efforts to help the mentally confused are a waste of valuable staff time (S)	42	58

	Agree	Disagree
2. Regularly reminding the mentally confused residents about what is going on is useless in helping them become less confused (S)	42	58
3. I think there is no point in having a special programme for the mentally confused residents since it really takes a lot of effort and they don't benefit from it (S)	83	17
4. It isn't a good idea to have a special meeting every day to help the confused residents (S)	50	50
5. Using signs on the doors doesn't help the confused residents to know where they are going (S)	17	83
6. The only reasonable way to treat the confused resident is like a child (S)	67	33
7. Large clocks and calendars in the sitting rooms don't help the confused residents to keep track of time (S)	29	71
8. Staff wearing name tags doesn't help the confused residents to remember names (S)	17	83
9. If I were mentally confused I wouldn't appreciate special efforts being made to help me (S)	0	100
10. Clocks, calendars and signposts annoy me (S)	0	100

It would appear from Tables 1 and 2 that greater negative response occurs to items related to reactions to the mentally impaired themselves than to RO efforts to help them. To test this each item was scored on a scale 0 - 3 equivalent to the scale from strong agreement to strong disagreement with negative statements. A positive attitude score on the scale 0 - 51 was computed for each resident on both pretest and post-test.
This was broken down into a total subscore for S items and a total subscore for R items. On pretest

the 12 residents showed a significantly higher score on S compared to R ($p < 0.003$) when results were compared using the sign test. The total attitude scores for the experimental (N = 6) and control (N = 6) groups are shown in Table 3.

Table 3 - Change in total mean attitude score between pretest and post-test.

	Pretest	Post-test	
E	28.0	31.7	$p < 0.031$
C	21.6	21.7	p = NS
	$p < 0.032$		

It can be seen (1) that the experimental group is significantly higher than the control group on total attitude score on pretest as determined by the Mann-Whitney U test and (2) that the experimental group has significantly higher attitude score on post-test when compared to pretest as determined by the Sign Test. When the improvement of the E group was looked at in relation to change on S items and R items no differential change on these two subscales was detected.

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DISCUSSION

Given the small numbers in our sample these results are merely suggestive. It does appear that mentally impaired residents are viewed negatively by the alert. However, the majority of alert residents do not express a view that the mentally impaired should be removed from the home. In general there is a more positive attitude towards attempts to help the mentally impaired and no suggestion that the more intrusive elements of RO e.g. orientation aids are unwelcome. The results of the brief education programme employed indicate that positive changes in the attitude of the alert towards the confused can be realized by such an approach. It is interesting to note that the group exposed to this programme, selected on the basis of their frequency of complaints about confused residents, were less negative in their attitudes than the alert residents who were not known to complain. Finally, there was some indication from the feelings of residents expressed in the group meetings with the administrator, that confused behaviour per se was not the sole source of complaints. Of two residents most complained about, one was not mentally impaired but had a severe hearing deficit and the other, although mentally impaired was considered to have had a life long personality problem. In considering care provision from the perspective of residents it would be worthwhile to investigate further the exact nature of interactional problems among residents. Certainly there is/

no indication from this short study that RO per se is viewed as intrusive by the alert elderly.

Appendix 17

Staff evaluation of Class RO Procedures

Introduction

Reality Orientation has been criticized as an overly mechanical 'indoctrination' procedure which largely presents an irrelevant 'reality' to patients receiving it (Gubrium & Ksander, 1975). As RO is an approach requiring the co-operation of all staff members it is of interest to try and ascertain how staff from various professions working with the mentally impaired elderly actually perceive RO. If staff perceive it as do Gubruim and Ksander then efforts to apply RO more extensively in the care of the mentally impaired elderly would be ill-advised and bound for failure. As there seems to be considerable variation in how RO is conducted in different settings it was decided to test reaction to the class procedures employed in this study both as a specific evaluation of these procedures themselves and as an indication of general raction towards the RO approach.

Method

A half-hour colour video recording was made of the class RO procedure in the local authority home setting and commentary concerning the procedure edited in at various points. This was presented to a multi-disciplinary staff group attending a workshop on care of the mentally impaired elderly. Participants having seen the video were asked to complete and return a questionnaire designed to evaluate their reactions to the RO procedure, as displayed on the video. The content of the evaluation questionnaire was prepared quite informally and was intended purely as a subjective indicator of reaction.

Results

Twenty-two questionnaires, some 40% of the questionnaire distributed, were returned from what must be fairly recognized as a selected sample of those working with the mentally impaired elderly. Respondents worked in the following capacities: Officers in charge of homes (2), local authority training officers (3), nursing officers (1), nurses (2), social workers (3), psychologists (7), occupational therapists (1), Education Director, Help the Aged (1), Director of charitable trust (1), Area team leader (1). The numbers agreeing, disagreeing and uncertain of each item in the questionnaire are shown below.

Listed below are some features of the class RO approach which the video attempted to illustrate. Having watched the video, do you think it shows that class RO:

		Yes	No	Can't say
(1)	Provides formal orientation to details of time, place and person	21	0	0
(2)	Encourages the use of past memories	21	0	1
(3)	Links the past with the present	15	4	3
(4)	Describes an overly simplified or largely irrelevant reality	3	14	5
(5)	Treats the elderly like children	8	8	6
(6)	Actively involves the group members	22	0	0
(7)	Encourages social interaction	18	3	1
(8)	Encourages communication	20	1	1
(9)	Utilizes prosthetic aids to orientation	22	0	0
(10)	Is impersonal and mechanical	1	17	3
(11)	Corrects residents confusion	15	2	4
(12)	Relates to activities in the home	16	2	3
(13)	Provides sensory stimulation	17	1	3
(14)	Recognizes the uniqueness of the individual	13	2	6
(15)	Acknowledges the elderly person's past life	15	1	5
(16)	Links the present with the future	15	2	4
(17)	Helps residents keep in touch with the world outside	16	1	3
(18)	Is rewarding for residents	17	0	4
(19)	An adult to adult approach	8	7	4
(20)	Would be welcomed by me if I were confused and in a home today	13	2	6

Comment

The overall reaction from this highly selected sample of respondents, the majority of whom have had working experience with the mentally impaired elderly, is highly favourable and indicates that the class procedure adopted in this study seemed to successfully meet a number of external criteria for effective therapy. Only two items (5 and 19) - both related to the degree to which the therapy treats the elderly in an adult way - return less than a decisive majority of respondents in agreement.

The positivity of the evaluation, although not made by staff working at 'grass-roots' level, suggests that we can be optimistic about the acceptability of RO procedures to those asked to consider and apply them with the mentally impaired elderly.

Appendix 18

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